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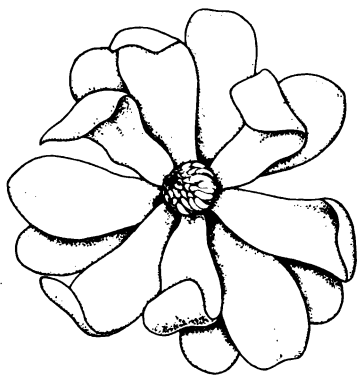
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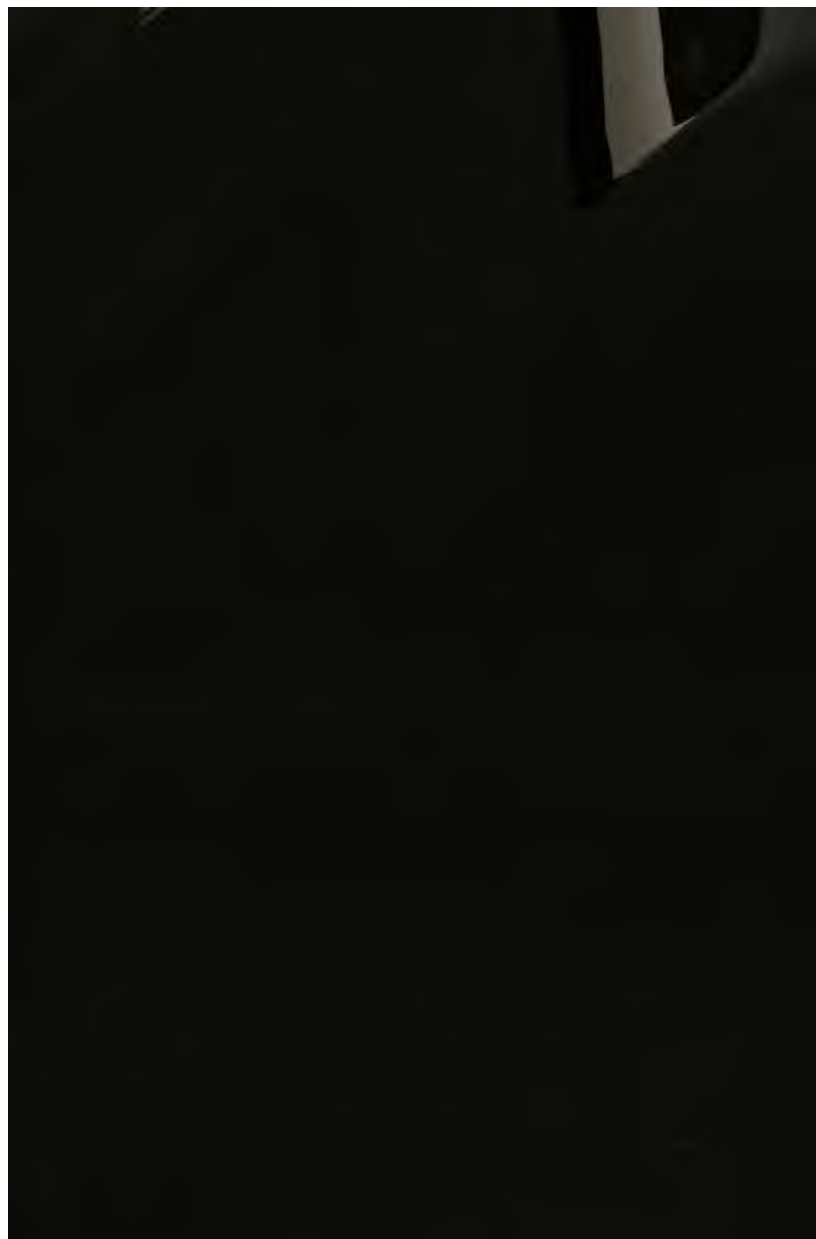
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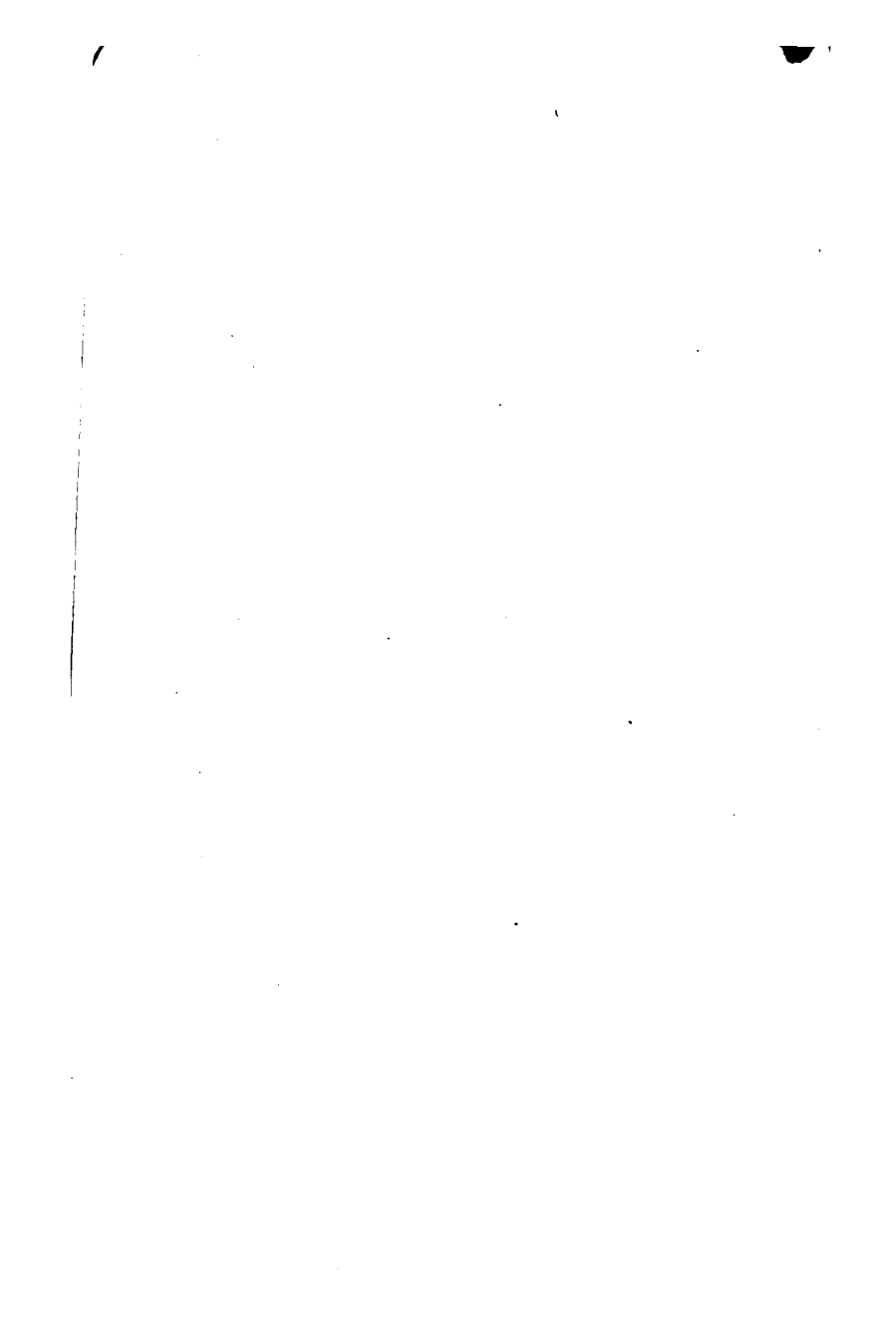


HARVARD UNIVERSITY



2000-01-01

F. W. Hammevell o d



ILLUSTRATED KEY TO THE
WILD AND COMMONLY
CULTIVATED TREES

OF THE
NORTHEASTERN UNITED STATES AND
ADJACENT CANADA

BASED PRIMARILY UPON LEAF CHARACTERS

BY
J. FRANKLIN COLLINS
AND
HOWARD W. PRESTON



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PREFACE

IN 1909 the authors published their "Key to New England Trees" which was then regarded as preliminary to an illustrated edition. Later it was decided to extend the geographic range of the forthcoming edition so as to include the north-eastern states and adjacent Canada.

428
This key is intended, as was the earlier one, to serve as a guide for those who wish to become acquainted with the wild and commonly cultivated trees of the region indicated. At the same time the book remains sufficiently small to be readily carried in the pocket. For the convenience of those who wish to learn more about the trees a bibliography of some of the more important works on the trees of northeastern America will be found on page 157. The illustrations are intended to show an outline of a typical leaf of every tree of which the leaves differ sufficiently from others to be recognized in a drawing. Where the leaves of two different trees are much alike an outline of one only is usually given, and an explanatory reference is made to this under the species not illustrated, at the proper place in the key.

It must be borne in mind that no two leaves on

a tree are exactly alike and that there is often a wide range of shapes on the same tree. For this reason the leaf outline shown (which is made from a fairly typical leaf as understood by the authors) may not be quite representative of what would be called a typical leaf of that species growing under different conditions, or in a different locality.

The bark of most trees is characteristic, but in many species, unfortunately, these characters cannot be brought out as clearly as could be desired in a halftone of the size used here. A consistent attempt has been made to illustrate only certain representative types. In certain cases, however, bark illustrations of several allied species of a group or genus are given. A full series seems hardly necessary, as the key is based primarily upon leaf characters.

Technical terms, to a large extent, have been eliminated. For the explanation of such as are used see the glossary on page 149. The geographic ranges given in the key must be interpreted as general rather than precise, as no attempt has been made to indicate the exact known limits for any species. Beside each outline drawing an inch scale, reduced in size to correspond with the reduction of the leaf, is shown. In a few cases a quarter inch scale is used, but in all such cases the scale is clearly so marked. By this device it is a simple

matter to determine the approximate size of any leaf.

Throughout the key occasional reference is made to cuts which illustrate the points under consideration.

After determining the name of a tree it is an excellent plan to go over the key again and make careful note of the particular characters that were used to separate it from other trees, especially the near allies. Also dry a leaf under moderate pressure and keep it for future reference. If these suggestions are followed systematically and conscientiously most of our common trees can soon be recognized at sight. The main object of this key is merely to guide the student through the preliminary stages of this recognition. A true knowledge of trees must be derived primarily from accurate and abundant study of the *trees* themselves.

To those who have had little or no experience in determining plants by means of botanical keys the following suggestions will be helpful.

Take the key with you into the field or wood.

Look over the tree and select typical (or average) leaves and twigs before attempting to use the key. As a rule only these should be considered. In most cases these need not be detached, and they should not be when there is any suspicion that objection might be raised to such a procedure, as might be

the case with street trees, park trees, and cultivated trees in general. If fruit characters are needed for identification and no fruit can be found on the tree, search the ground directly beneath for old fruits. If any are found, they may usually be regarded as having dropped from the tree, unless the fruit is easily blown by the wind, or the ground is sloping and other trees grow higher up the slope where fruits might easily roll down.

In using the key begin with No. 1 and read the two lines preceded by this number, deciding which one of the two applies to the tree under consideration. If the leaves of our tree are more than $\frac{1}{8}$ of an inch long, as most leaves are, we next pass to No. 2, as indicated by the figure 2 following this line, and read the two lines preceded by the figure 2, deciding which one of these two applies to our tree, and again passing to the number indicated after the proper line. This simple process is repeated until we reach one or more common names in **full faced** type. If a number is found after this name (as in No. 6) it means that the name is that of a genus including two or more species. In order to decide which species of the genus we have, we pass to the number indicated and proceed as before. To illustrate this, suppose we reach No. 6, in the key, deciding that we have a Pine, we next turn to No. 76 in order to find *which* Pine we have, by

a process exactly similar to that mentioned above. Preceding No. 76 will be found a few briefly stated characteristics of the Pine genus. A similar characterization will be found preceding all other genera which contain more than one species. Finally we arrive at a point where no number is indicated after the line chosen. The common name (or names, where a tree is known by several names in the same or in different localities) will here be found in **full faced** type, except in case of some of the Thorns, and the scientific name in *italics*. If more than one common name is given the first is usually preferred, the subsequent ones being either less distinctive, less common, or merely local within our range.

The names of states and authorities for scientific names are abbreviated in the usual manner. The word "cultivated" is abbreviated to "cult.", and "figure" and "figures" to "Fig." and "Figs."

Where conflicting opinions exist in regard to specific limitations and names the 7th edition of "Gray's Manual" has been followed, particularly in such groups as Thorns, Alders, Birches, etc.

The coöperation of all who use this book, in reporting errors which they discover, is desired by the authors.

The authors herewith acknowledge their indebtedness to Prof. M. L. Fernald for many valued criticisms and suggestions.



CONTENTS

PREFACE.....	iii
KEY TO GENERA AND SPECIES.	I
A SYSTEMATIC LIST OF TREES GROUPED IN FAMILIES, WITH PAGE REFERENCES.....	161
INDEX TO TREE NAMES	171



KEY TO GENERA AND SPECIES

1. Leaves very small and scale-like, closely appressed and overlapping; less than $\frac{1}{8}$ of an inch long. (See Figs. 5, 7.)—7.
1. Leaves more than $\frac{1}{8}$ of an inch long, not closely overlapping. (See Figs. 90, 192.)—2.
2. Leaves awl-shaped (i. e., narrow and tapering from the base to a rather sharp apex); $\frac{1}{4}$ to $\frac{3}{4}$ of an inch long and $\frac{1}{16}$ to $\frac{1}{8}$ of an inch wide. (See Figs. 1, 2a.) Fruit a blue berry-like cone—4.
2. Leaves not awl-shaped—3.
3. Leaves needle-shaped (i. e., slender, about the same thickness throughout, and in cross-section either semi-circular, triangular, or rhombic), not conspicuously flattened. (See Figs. 63, 64.)—5.
3. Leaves flattened and distinctly narrowed at the point of attachment, with or without a distinct leaf-stalk. (See Figs. 12, 184.)—9.
4. Leaves three at a node, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long and about $\frac{1}{16}$ of an inch wide, all

2 KEY TO GENERA AND SPECIES

alike; whitened on the real upper surface (which is commonly turned towards the ground) and green on the lower surface, spiny pointed. Rarely a small tree, generally a shrub. Central New England and southward in the mountains. **Common Juniper**, *Juniperus communis* L. The low spreading **Dwarf Juniper** (var. *depressa* Pursh), with leaves rarely $\frac{1}{2}$ inch long, is the common form of this species in New England and westward. (Figs. 1, 3.)



Fig. 1. Dwarf Juniper.

4. Leaves of two forms, one form awl-shaped, two at a node, with the real upper surface whitened, as in the Common Juniper; the other (usually on older trees) consisting of short overlapping scale-like leaves arranged in four more or less distinct longitudinal rows. Southern Maine and New Hampshire southward and westward. (Figs. 2, 3, 4.)



Fig. 2. Red Cedar. a. Twig with awl-shaped leaves; b. Twig with scale-like leaves; c. Section of b.

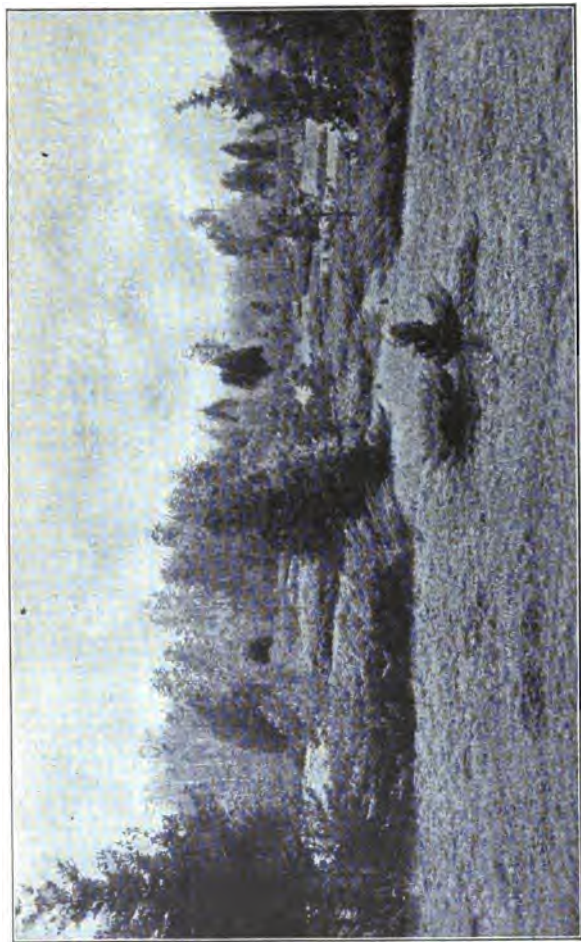


Fig. 3. Dwarf Juniper (the low spreading growth).
Red Cedar (the conical tree of the middle ground).

4 KEY TO GENERA AND SPECIES

Red Cedar, Savin, *Juniperus virginiana* L.

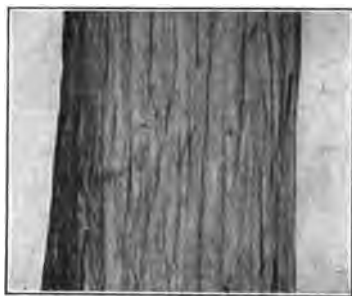


Fig. 4. Red Cedar.

- 5. Leaves in well marked clusters on the side of the branch—6.
- 5. Leaves not in definite clusters on the side of the branch—**Spruce, 85.**
- 6. Leaves five or less in a cluster—**Pine, 76.**
- 6. Leaves seven or more in a cluster—**Larch, 84.**

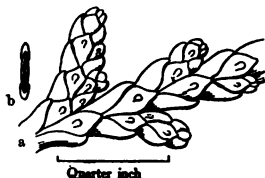


Fig. 5. Arbor Vitae. a. Side view of twig; b. Section of twig.

- 7. Young leafy shoots conspicuously flattened or two-edged. Northern and western New England northward and westward, also south-

ward in the mountains, and cult. (Figs. 5, 6.)
Arbor Vitae, Cedar, White Cedar, *Thuja occidentalis* L.



Fig. 6. Arbor Vitae.

7. Young leafy shoots not conspicuously flattened—8.
8. Leaves of two kinds; (a) awl-shaped and spiny pointed and whitened above, less than $\frac{1}{2}$ inch long, more common on young trees, but generally present also on some parts of older trees; (b) small and scale-like, smallest and youngest shoots conspicuously 4-angled. Fruit a bluish white berry-like cone about $\frac{1}{4}$ of an inch or less thick. Trees of drier situations—dry sandy fields and hillsides—rarely in low wet ground. Southern Me. and N. H. southward and westward. (Figs. 2, 3, 4.) **Red Cedar, Savin, *Juniperus virginiana* L.**

6 KEY TO GENERA AND SPECIES

8. Leaves of one kind only; small and scale-like, some of the leaves commonly with a minute swelling or gland on the back. Smallest and youngest shoots cylindric, not conspicuously 4-angled nor flattened. Fruit a small dry brownish cone about $\frac{1}{4}$ of an inch thick, with shield-shaped scales. Trees of moist situations — swamps, bogs, etc. — rarely in dry soil. Common from N. H. to Miss. within 100 miles of the coast. (Fig. 7.) **Coast White Cedar**, *Chamaecyparis thyoides* (L.) BSP.



Fig. 7. Coast White Cedar. a. Side view of twig; b. and c. Sections of twig.

9. Leaves less than $\frac{1}{8}$ of an inch wide—10.
 9. Leaves more than $\frac{1}{8}$ of an inch wide—13.
10. Leaves three at a node, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long and about $\frac{1}{16}$ of an inch wide, all alike; whitened on the real upper surface (which is commonly turned towards the ground) and green on the lower surface, spiny pointed. Rarely a small tree, generally a shrub. Central New England and southward in the mountains. **Common Juniper**, *Juniperus communis* L. The low spreading **Dwarf**

Juniper (var. *depressa* Pursh), with the leaves rarely $\frac{1}{2}$ an inch long, is the common form of this species in New England and westward. (Figs. 1, 3.)

10. Leaves not whitened above—11.

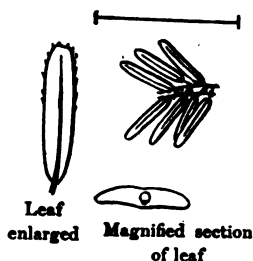


Fig. 8. Hemlock.

11. Leaves evergreen, about $\frac{1}{2}$ inch long, blunt, whitened beneath, and with a distinct short slender leaf-stalk. Ontario, Quebec, New Brunswick, and southward. (Figs. 8, 9.)



Fig. 9. Hemlock.

Hemlock, Hemlock Spruce, *Tsuga canadensis* (L.) Carr.

11. Leaves evergreen, usually at least $\frac{3}{4}$ of an inch

8 KEY TO GENERA AND SPECIES

long, blunt, narrowed at the base, but without a distinct sharply defined leaf-stalk; often whitened beneath and sometimes more or less curved—12.

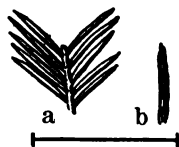


Fig. 10. Bald Cypress. a. Side view of normal shoot; b. Glyptostrobus shoot.

11. Leaves $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, pointed at the apex, green or yellow-green on both surfaces,* falling from the tree in the autumn (i. e., deciduous), narrowed at the base but without a distinct leaf-stalk,† spreading along two sides of the twig. Swamps from Del. south-



Fig. 11. Bald Cypress.

* Very rarely somewhat whitened beneath.

† There is another form of this tree (or occasionally branches of a tree) with short appressed sharply pointed leaves, and slender almost pendulous branches. (Fig. 10b.) This is the form which formerly passed in cultivation as *Glyptostrobus pendulus* Endl.

ward and west-
ward. (Figs. 10,
11.) **Bald Cypress,**
Taxodium disti-
chum (L.) Richard.

12. Mature leaves con-
spicuously whiten-
ed beneath. Cones
upright. North-
eastward from Pa.

and Wis. (Figs. 12,
13.) **Balsam Fir, Balsam, Firtree, Balm**
of Gilead Fir, *Abies balsamea* (L.) Mill.

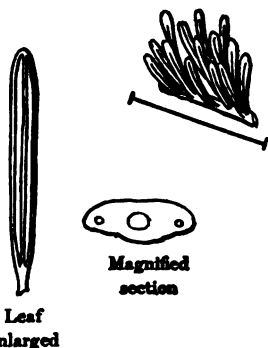


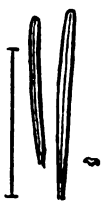
Fig. 12. Balsam Fir.



Fig. 13. Balsam Fir, showing blisters on young trunk.

10 KEY TO GENERA AND SPECIES

12. Mature leaves not conspicuously whitened beneath. Cones hanging or pendulous, with leaf-like toothed appendages projecting beyond the scales. Cult. Native west of our range. (Fig. 14.)



Douglas Spruce, Red Fir, Douglas Fir, *Pseudotsuga taxifolia* Britt.

Fig. 14.
Douglas
Spruce;
2 leaves
and a
section.

13. Leaves simple, with a single blade.
(See Figs. 96, 243.)—14.
13. Leaves compound, with 3 or more wholly separate blades (leaflets). (See Figs. 117, 203.)—63.

14. With 3 or more main veins of nearly equal prominence starting from the base of the blade. (See Figs. 19, 246.)—15.

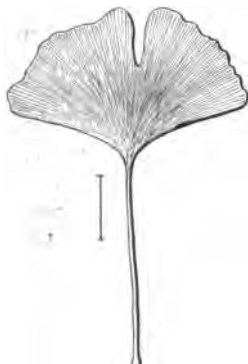


Fig. 15. Ginkgo.

14. With only one prominent vein. (See Figs. 84, 191.)—23.
14. With very many fine veins, all of equal prominence, radiating from the base of the fan-

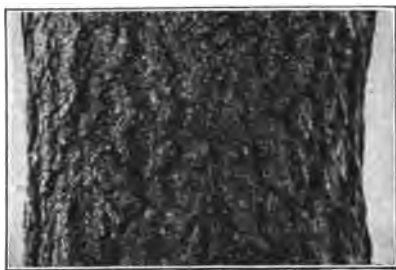


Fig. 16. Ginkgo. Old trunk.

shaped blade. Cult. Native in eastern Asia.
(Figs. 15, 16, 17.) **Ginkgo, Maiden-hair
Tree, *Ginkgo biloba* L.**



Fig. 17. Ginkgo. Young trunk and twigs.

15. With one leaf at a node
(i. e., leaves alter-
nate)—18.

15. With two or more
leaves at a node
(i. e., leaves opposite
or whorled)—16.

16. Leaf margins strongly
indented in 2 or 4
places, these inden-
tations variable, but
usually reaching at
least $\frac{1}{3}$ of the dis-
tance to the base of
the blade. Fruit
with a flat wing—
Maple, 186.

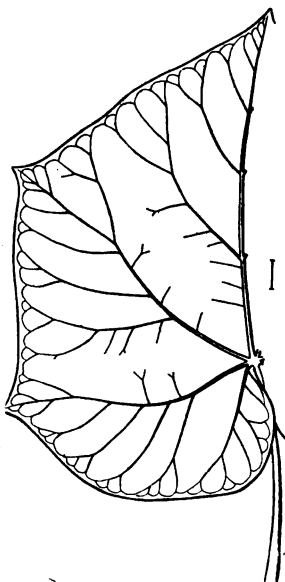


Fig. 18. Paulownia. Half of
a leaf.

16. Leaves usually with
only one indentation and this at the base
(i. e., leaves heart-shaped), occasionally some
leaves with one or two angles or shallow
indentations on the sides. No small mar-
ginal teeth—17.

17. Fruit 12 to 18 inches long, cylindric—**Catalpa,**
208.

17. Fruit globular or topshaped. Cult. Native in

eastern Asia. (Fig. 18.)

Paulownia, *Paulownia tomentosa* (Thunb.) Steud.

18. Prominent veins at the base of the blade 5 or more *—19.

18. Prominent veins at the base of the blade 3 * (rarely 5)—20.

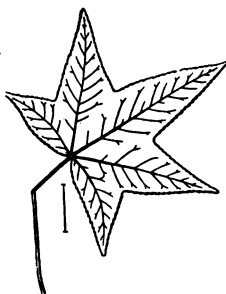


Fig. 19. Sweet Gum.

19. Leaves strongly star-shaped. Conn. and south-westward, also cult. (Figs. 19, 20.) **Sweet**



Fig. 20. Sweet Gum.

Gum, Red Gum, Alligator-wood, Liquidambar, *Liquidambar Stryaciflua* L.

* In some cases the lowest veins are less prominent than the upper. At such times uncertainty may arise as to which No. 18 should be followed when trying to decide between 3 and 5 veins.

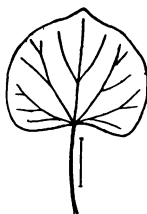


Fig. 21. Redbud.



Fig. 22. Redbud.

19. Leaves symmetrically heart-shaped, margins entire. N. Y. southward and westward, also cult. (Figs. 21, 22.) **Redbud, Judas-tree, *Cercis canadensis* L.**
19. Leaves unsymmetrically heart-shaped, margins toothed—**Linden, 198.**
20. Leaves broader than long, with strong angles or shallow indentations. Southern Me. southward and westward. (Figs. 23, 24, 25.) **Buttonwood, Buttonball-tree, Plane-tree, American Sycamore, Sycamore, *Platanus occidentalis* L.**
20. Leaves longer than wide—21.
21. Leaf length not twice the width. Juice milky—22.
21. Leaf length not twice the width. Juice not milky. Base of blade unsymmetrical—**Linden, 198.**



Fig. 23. Buttonwood.



Fig. 24. Buttonwood.
Young trunk.



Fig. 25. Buttonwood. Old trunk.

21. Leaf length more than twice the width. Juice not milky. Southern New England southward and westward. (Figs. 26, 27.) **Hackberry, Sugarberry, Nettle-tree, Oneberry,** *Celtis occidentalis* L.

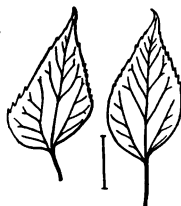


Fig. 26. Hackberry.

22. Fruit globular, about $\frac{3}{4}$ of an inch thick. Cult. and escaped. Native in eastern Asia. (Fig. 28.) **Paper Mulberry,** *Broussonetia papyrifera* (L.) Vent.
22. Fruit longer than broad, less than $\frac{1}{2}$ inch thick —**Mulberry, 148.**



Fig. 27. Hackberry.

23. Margins either wavy, toothed, incised, or lobed. (See Figs. 46, 126, 169, 225.)—35.
23. Margins entire, without any of the above characters. (See Figs. 40, 150.)—24.
24. Twigs and bark emitting a pleasant spicy odor when bruised. Some of the leaves with a

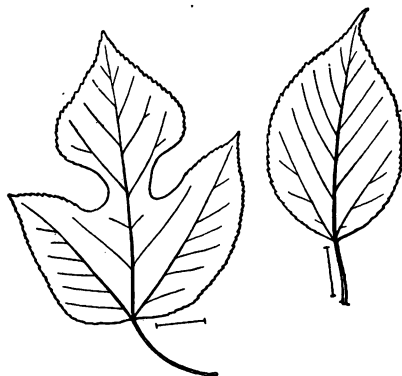


Fig. 28. Paper Mulberry.

prominent lobe on one or both sides. Leaf-stalk usually more than $\frac{3}{4}$ of an inch long. Fruit blue when ripe, about $\frac{1}{4}$ of an inch long, on a red stalk, enclosing a single seed-like stone. Central New England southward and westward. (Figs. 29, 30, 31.) **Sassafras**, *Sassafras variifolium* (Salisb.) Ktze.



Fig. 29. Sassafras.

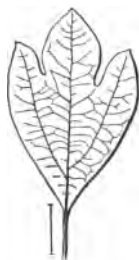


Fig. 30. Sassafras.



Fig. 31. Sassafras.

24. Twigs and bark emitting a disagreeable or heavy odor when bruised. Leaves without any lobes. Leaf-stalk usually less than $\frac{1}{2}$ inch long. Fruit fleshy and edible, green or brown when ripe, $1\frac{1}{2}$ to 5 inches long, enclosing several large seeds. Central N. Y. westward and southward. (Fig. 32.) **Papaw, Common Papaw, Custard Apple, *Asimina triloba*** Dunal.

24. Twigs and bark not particularly fragrant nor with an unpleasant odor when bruised. None of the leaves lobed—25.



25. Leaves thick, smooth, and evergreen—26.

Fig. 32. Common Papaw.

25. Leaves thin or else hairy beneath, dropping at the end of the season—27.



Fig. 33.
Mountain
Laurel.

26. Leaves 2 to 5 inches long, green on the under surface. New Brunswick and southwestward. (Fig. 33.) **Mountain Laurel, Calico Bush, Spoonwood,** *Kalmia latifolia* L.

26. Leaves 4 to 12 inches long, with a russet, tawny, or cinnamon-colored under surface. Central New England southwestward, also locally in Nova Scotia and northern New England. (Fig. 34.) **Rhododendron, Great Laurel, Rose Bay,** *Rhododendron maximum* L.



Fig. 34.
Rhodo-
dendron.

27. Side veins curving nearly to the apex of the leaf—**Cornel, 201.**
27. Side veins not curving nearly to the apex of the leaf—28.

28. Branches with at least a few spines or thorns (usually many). Lower Mississippi valley, also cult. and escaped. (Figs. 35, 36.) **Osage Orange, Ma-chura pomifera** (Raf.) Schneider.



Fig. 35.
Osage
Orange.

28. Branches without spines or thorns—
29.

29. Leaves opposite or whorled—30.

29. Leaves alternate—31.



Fig. 36. Osage Orange.

30. Leaves mostly 3 at a node (whorled), rounded or pointed at the base. New Brunswick southwestward. (Fig. 37.) **Buttonbush**, *Cephalanthus occidentalis* L.

30. Leaves opposite, with an abrupt or slightly heart-shaped base. Cult. and escaped. Native in Eurasia. (Fig. 38.) **Lilac**, *Syringa vulgaris* L.

30. Leaves opposite, blade broadest at the middle or above. N. J. southwestward and cult. (Fig. 39.) **Fringe-tree**, **White Fringe**, *Chionanthus virginica* L.

31. Leaves 7 inches or more long — **Magnolia**,
149.

31. Leaves less than 7 inches long—32.



Fig. 37.
Button-
bush.



Fig. 38.
Lilac.

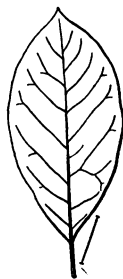


Fig. 39.
Fringe-tree.



Fig. 40.
Persimmon.

32. Terminal bud $\frac{1}{2}$ inch or more long—**Mag-nolia**, 149.
32. Terminal bud less than $\frac{1}{4}$ of an inch long—33.
33. Leaves not twice as long as wide, under surface woolly-hairy. Cult.—**Quince**, 152.
33. Leaves not twice as long as wide, under surface smooth. Cult.—**Sumach**, 182.
33. Leaves at least twice as long as wide, apex more or less pointed—34.
34. Leaves somewhat rounded at the base, pointed at the apex. Fruit a globular berry an inch or more thick. Conn. southwestward and occasionally cult. (Figs. 40, 41.) **Persim-mon**, **Date Plum**, *Diospyros virginiana* L.
34. Leaves more or less pointed at both ends.



Fig. 41. Persimmon.

Fruit elongated, fleshy or juicy, less than $\frac{1}{2}$ inch long, with the seed enclosed in a hard stone. Central Me. southwestward and westward. (Figs. 42, 43.) **Tupelo, Black Gum, Sour Gum, Gum, *Nyssa sylvatica* Marsh.**



Fig. 42.
Tupelo.



Fig. 43. Tupelo.

34. Leaves pointed at both ends. Fruit an acorn (i. e., a nut with its base set in a woody cup which is composed of closely overlapping small scales)—**Oak, 126.**
35. Margin with no deep indentations (i. e., not more than $\frac{1}{3}$ of the distance to the midrib). (See Figs. 46, 171.)—36.



Fig. 44. Tulip Tree.

35. Margin indented more than $\frac{1}{3}$ of the distance to the midrib, often almost to the base (i. e., lobed or divided). (See Figs. 155, 208.)—38
36. Leaves abruptly cut off or indented at the broad apex. Margin with a few large angles or shallow lobes, but with no small teeth. Central New England southward and westward, also cult. (Figs. 44, 45.) **Tulip Tree,**



Fig. 45. Tulip Tree.

White Wood, Yellow Poplar, *Liriodendron Tulipifera* L.

36. Leaves rounded or pointed at apex. Margin wavy, with no distinct teeth nor bristle-tipped lobes, larger indentations of the margin not exceeding $\frac{1}{3}$ of the distance to the midrib. (See Figs. 46, 171.)—37.

36. Leaves rounded or pointed at apex. Margin with distinct teeth or small notches, or with a few bristle-tipped lobes or angles. (See Figs. 47, 196.)—39.

37. Base of blade unsymmetrical. New Brunswick southwestward. (Fig. 46.) **Witch Hazel, *Hamamelis*, *Hamamelis virginiana* L.**



37. Base of blade nearly or quite symmetrical. Buds short, not

Fig. 46.
Witch Hazel.

$\frac{1}{4}$ of an inch long. Bark not smooth and gray *—**Oak, 126.**

37. Base of blade nearly or quite symmetrical. Buds $\frac{1}{2}$ inch or more long, sharply pointed. Bark smooth and gray, even on old trunks *—**Beech, 122.**

38. Margin both deeply cut or indented, and toothed. (See Figs. 126, 208.)—**61.**

38. Margin deeply notched or indented, but not toothed. (See Figs. 30, 44.)—**59.**

39. Leaves thick, evergreen, with stiff and spiny teeth. Mass. southward along the coast, also cult. (Fig. 47.) **Holly, American Holly, White Holly, *Ilex opaca* Ait.**



Fig. 47.
Holly.

39. Leaves thin—**40.**

40. Leaves and branches opposite, or seemingly so—**41.**

40. Leaves and branches alternate—**42.**

* The bark of the Gray Oak in eastern Maine is smooth and Beech-like. It is doubtless of this character elsewhere. The Gray Oak may readily be known (as contrasted with the Beech) by its lobed leaves, by its fruit, or by its winter bud characters.

41. Branches without thorns or spines, side veins of the blade not curving into the apex—**Arrow-wood, 209.**

41. Branches commonly with a few spines or thorns, side veins of the blade curving well up into the apex. Cult. and escaped. Native in Eurasia. (Fig. 48.) **Buckthorn, *Rhamnus cathartica* L.**

42. Branches with thorns—43.

42. Branches without thorns—44.

43. Thorns on the side of leafy branches—**Thorn, 159.**

43. Thorns commonly formed by the pointed ends of branches. Fruit usually with 5 thin-walled seed compartments—**Apple, Pear** (in semi-wild state), **152.**



Fig. 48.
Buckthorn.

43. Thorns commonly formed by the pointed ends of branches. Fruit with a single seed enclosed in a hard stone—**Plum, 175.**

44. Side veins nearly straight, usually unbranched. (See Figs. 143, 146, 178.)—45.

44. Side veins curving or prominently forking. (See Figs. 258, 263, 275.)—54.

45. Leaf base very unsymmetrical, as a rule, and the margins doubly toothed. Fruit flat, with a broad wing surrounding the single seed. (See Fig. 178.)—**Elm, 144.**
45. Leaf base symmetrical, or nearly so. (See Fig. 153.)—**46.**
46. Margins with coarse teeth or angles, less than 6 per inch, or else with straight side veins, each terminating in a bristle-like tooth. (See Figs. 146, 172.)—**47.**
46. Margins with small teeth, more than 6 per inch. (See Figs. 49, 131.)—**49.**
47. Fruit a nut; one to several nuts completely enclosed in a prickly bur until mature. Each of the numerous side veins of the leaf-blade terminating in a marginal tooth—**48.**
47. Fruit a nut with its base set in a scaly cup. Leaf margins commonly with a few large angular teeth or shallow angular lobes, each tipped with a short bristle—**Oak, 126.**
48. Nut triangular in section. Bark of trunk smooth, firm, and gray—**Beech, 122.**
48. Nut not triangular in section. Bark of older trunks furrowed—**Chestnut, 125.**

28 KEY TO GENERA AND SPECIES

49. Bark chalky white or whitish, or (if dark colored) with the outer layers of the bark separable into thin papery layers—**Birch, 111.**
49. Bark not chalky white, nor whitish—50.
50. Small twigs aromatic when bruised—**Birch, 111.**
50. Small twigs not aromatic when bruised—51.
51. Leaves taper-pointed. (See Fig. 49.)—52.
51. Leaves not taper-pointed. (See Figs. 123, 137.)—53.



Fig. 49. Hop Hornbeam.



Fig. 50. Hop Hornbeam.

52. Surface of the bark brownish, with somewhat shredded flakes or scales. New Brunswick southward and westward. (Figs. 49, 50.)
Hop Hornbeam, Ironwood, Leverwood, Hornbeam, Hardhack, *Ostrya virginiana* (Mill) K. Koch.

52. Surface of the bark close and gray, with no tendency to become furrowed or scaly, although the trunk commonly produces at least a few muscle-like or tendon-like ridges, giving it a characteristic appearance. New Brunswick southward and westward. (Figs. 51, 52.)
American Hornbeam, Blue Beech, Water Beech, Hornbeam, Ironwood, *Carpinus caroliniana* Walt.

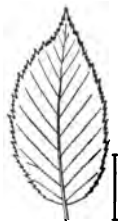


Fig. 51.
 American
 Hornbeam.

53. Leaves with a broadly wedge-shaped (or abrupt) and entire base, and a pointed apex. Twigs reddish. Bark of old trunks reddish or



Fig. 52. American Hornbeam.

brownish, forming scales with upturned papery margins — **Birch**, 112.

53. Leaves usually rounded at one or both ends. Bark without papery-margined scales—**Alder**, 119.

54. Blade nearly as wide as long, with an unsymmetrical and usually heart-shaped base—**Linden**, 198.

54. Blade usually longer than wide, or with the base nearly or quite symmetrical—55.

54. Blade longer than wide and with an unsymmetrical base. Fruit very flat—**Elm**, 144.

55. Fruit fleshy or juicy, commonly globular, not splitting open at maturity. Wood commonly rather heavy and hard—56.

55. Fruit neither globular, fleshy nor juicy; splitting open at maturity. Seeds with long cottony hairs. Wood soft and light. Twigs commonly brittle—58.

55. Fruit small and dry, in large loose clusters, splitting open at maturity. Seeds spindle-shaped (long pointed at each end). Wood heavy and hard. Leaves 4 or 5 inches long and an inch or more wide, pointed at both ends. Penn. southward and westward.

(Fig. 53.) **Sourwood, Sorrel-tree, *Oxydendrum arboreum* (L.) DC.**

NOTE.—The Hop Hornbeam may be sought here if the side veins of the blade are more curved than usual.

56. Fruit with a single central stone which encloses a single seed—**Cherry, Plum, Peach, 175.**

56. Fruit with the seeds in thin-walled compartments—57.

57. Fruit less than $\frac{1}{2}$ inch thick—**Juneberry, 158.**

57. Fruit $\frac{3}{4}$ to 2 inches or more thick—**Apple, Pear, 152.**

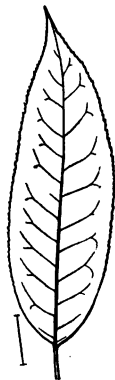


Fig. 53.
Sourwood.

58. Leaf-stalk less than $\frac{1}{4}$ the length of the blade, or else the width of the blade less than $\frac{1}{2}$ the length of the blade*—**Willow, 91.**

58. Leaf-stalk more than $\frac{1}{4}$ the length of the blade, or else the blade nearly as wide as long*—**Poplar, 98.**

* Exceptionally narrow-leaved forms of the Balsam Poplar may be distinguished, from Willows, by the strong balsamic odor of leaves and buds, and by the metallic-looking sticky lower surface of their leaves.

59. Leaves abruptly cut off or indented at the broad apex. Central New England southward and westward, also cult. (Figs. 44, 45.) **Tulip Tree, White Wood, Yellow Poplar**, *Liriodendron Tulipifera* L.

59. Leaves pointed or rounded at the apex, not indented—60.

60. Twigs bright or shining green, bark spicy aromatic when bruised. Central New England southward and westward. (Figs. 29, 30, 31.) **Sassafras**, *Sassafras variifolium* (Salisb.) Ktze.

60. Twigs not spicy aromatic—**Oak**, 126.

NOTE.—The Fern-leaved Beech (occasionally planted), with smooth gray bark, long pointed buds, and deeply divided leaves, may be sought here if the leaf margins are less deeply cut than usual.

61. Branches thorny. **English Hawthorn**—159.

61. Branches not thorny—62.

62. Bark whitish and papery. Cult.—**Cut-leaved Birch**, 114.

62. Bark not whitish and papery—**Oak**, 126.

NOTE.—The Fern-leaved Beech (occasionally

planted), with smooth gray bark, long pointed buds, and deeply divided leaves, may be sought here if the leaves are somewhat toothed as well as deeply cut.

63. Leaflets all attached at one point (i. e., leaves palmately compound), with no stalk to any of the leaflets. Cult.—**Horse-chestnut, Buckeye, 195.**

63. Leaflets scattered along both sides of the common axis (i. e., leaves pinnately compound); if composed of only 3 leaflets then the terminal one with a distinct individual stalk. (See Figs. 234, 237.)—64.

64. Leaves with an odd leaflet at the tip—67.

64. Leaves usually with a pair of leaflets at the tip—65.

65. With thorns on the branches or trunk. Central N. Y. and Penn. southwestward and westward, also cult. and escaped. (Figs. 54,



Fig. 54. Honey Locust. a. Once compounded leaf; b. Portion of a twice compounded leaf.



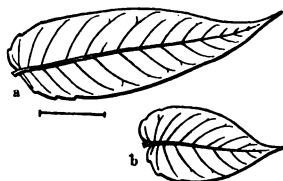
Fig. 55. Honey Locust.



Fig. 56. Honey Locust. Thorns on young trunks.

55, 56.) **Honey Locust, Three-thorned Acacia, Honey Shucks, Honey, *Gleditsia triacanthos* L.**

65. Without thorns—66.



66. Leaves once compound. Cult. and escaped. Native of

China. (Figs. 57, 58.) **Tree of Heaven, Ailanthus, Chinese Sumach, *Ailanthus glandulosa* Desf.**

Fig. 57. Tree of Heaven, Ailanthus. Two leaflets from a leaf made up of 31 leaflets. a. From middle of leaf. b. From base of leaf.

Leaves twice compound, at least in part of the leaf. Central N. Y. westward and south-

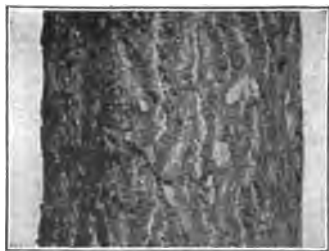


Fig. 58. Tree of Heaven, Ailanthus.

westward, also cult. (Figs. 59, 60.) **Kentucky Coffee-tree, *Gymnocladus dioica* (L.) Koch.**



Fig. 59. Kentucky Coffee-tree. Portion of a leaf.

67. Leaves only once compound. (See Figs. 234, 271.)—68.
67. Leaves twice compound, at least in part of the leaf. Central N. Y. westward and



Fig. 60. Kentucky Coffee-tree.

southwestward, also cult. (Figs. 59, 60.)
Kentucky Coffee-tree, *Gymnocladus dioica*
(L.) Koch.

68. Leaves opposite—69.
68. Leaves alternate—70.
69. Wing of the fruit unsymmetrical, thickened at one edge. Leaflets usually 3 or 5. Western New England southward and westward, also cult. and escaped—**Box Elder, Ash-leaved Maple, 186.**
69. Wing of fruit symmetrical, not thickened at one edge. Leaflets usually 7 or 9—**Ash, 202.**
70. Margins of leaflets more or less regularly toothed, at least above the middle. (See Figs. 204, 234.)—73.
70. Margins of leaflets without teeth, at least none above the middle. (See Figs. 57, 235.)—71.
71. Leaflets commonly with one or more irregular teeth or notches near the base. Fruit nearly 2 inches long, very thin, with one seed near the middle. Cult. and escaped. Native in China. (Figs. 57, 58.) **Tree of Heaven, Ailanthus, Chinese Sumach, *Ailanthus glandulosa* Desf.**
71. Leaflets without the basal teeth. Fruit flat-tish, usually at least 2 inches long, several seeded—72.
71. Leaflets without the basal teeth. Fruit globu-

lar, usually less than $\frac{1}{4}$ of an inch thick—**Sumach**, 182.

72. Leaflets opposite. Bark deeply furrowed—**Locust**, 181.

72. Leaflets alternate. Bark smooth and gray. Tenn. and adjoining area, also cult. (Figs. 61, 62.) **Yellow Wood**, *Cladrastis lutea* (Michx. f.) Koch.

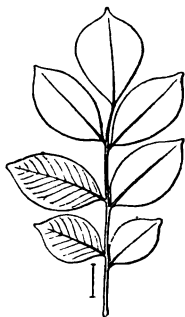


Fig. 61.
Yellow Wood.

73. Juice milky. Pith occupying more than half the diameter of the youngest branches—**Sumach**, 182.

73. Juice not milky. Pith not occupying half the diameter of the youngest branches—74.

74. Fruit fleshy, red, globular; less than $\frac{1}{2}$ inch thick; in flat-topped clusters. Leaflets commonly more than 11. Bark of trunk usually smoothish—**Mountain Ash**, 157.

74. Fruit a dry nut, $\frac{1}{2}$ inch or more thick. Leaflets either less than 11, or else the bark of the trunk prominently furrowed—75.

75. Exterior husk of fruit not splitting away at maturity. Nut roughened with jagged



Fig. 62. Yellow Wood.

points or ridges. Leaflets usually 9 to 17—**Walnut, 106.**

- 75.** Exterior husk of fruit splitting vertically into 4 parts at maturity. Nut smooth. Leaflets usually 5 to 9—**Hickory, 107.**

PINE.—Leaves needle-shaped, 2 to 5 in a cluster. Fruit a cone, composed of woody closely



Fig. 63.
White Pine.

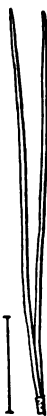


Fig. 64.
Yellow Pine.



Fig. 65.
Pitch Pine.

crowded and overlapping scales attached to all sides of a common (usually short) axis.

76. Leaves 5 in a cluster. Throughout our range. (Figs. 63, 67.) **White Pine, Soft Pine, *Pinus Strobus* L.**

76. Leaves commonly 3 in a cluster—77.

76. Leaves commonly 2 in a cluster—79.

77. Leaves 1 to 3 inches long. N. J. and southwestward. (Fig. 64.) **Yellow Pine, Shortleaf Pine, *Pinus echinata* Mill.**

77. Leaves 3 to 5 inches long—78.

77. Leaves 6 to 9 inches long. Southern N. J.



Fig. 66.
Loblolly Pine. Leaf cluster and section of a leaf.

southward along the coast. (Fig. 66.)
Loblolly Pine, Old-field Pine, *Pinus Taeda* L.



Fig. 67. White Pine.

78. Sheaths at the base of the leaf-clusters short.
 Cone scales with a short rigid prickles at the



Fig. 68. Pitch Pine.

tip. New Brunswick southwestward. (Figs. 65, 68.) **Pitch Pine, Hard Pine, *Pinus rigida* Mill.**

78. Sheaths at the base of the leaf-clusters long.
Cone scales with a small weak short prickles
at the tip. N. J. southwestward. (Fig. 64.)
Yellow Pine, Shortleaf Pine, *Pinus echinata*
Mill.

79. Leaves 1 to 4 inches long—60.

79. Leaves 4 to 6 inches long—83.

79. Leaves 6 to 9 inches long. Southern N. J.
southward along the coast. (Fig. 66.)
Loblolly Pine, Old-field Pine, *Pinus Taeda* L.



Fig. 69. Table
Mountain Pine.
Leaf cluster and
section of a leaf.



Fig. 70.
Jersey Pine.



Fig. 71. North-
ern Scrub Pine.
Leaf cluster and
section of a leaf.

80. Cone scales with a small weak prickles at the
tip. N. J. southwestward. **Yellow Pine,
Shortleaf Pine, *Pinus echinata* Mill.**

80. Cone scales with a strong sharp prickles at the
tip—81.

80. Cone scales usually without a prickles—82.

81. Tip of the cone scales with a stout hooked prickles or spine about $\frac{1}{4}$ of an inch long. Penn. southwestward along the mountains. (Fig. 69.) **Table Mountain Pine**, *Pinus pungens* Lamb.
81. Tip of the cone scales with a slender prickles barely $\frac{1}{8}$ of an inch long. Long Island south-



Fig. 72. Northern Scrub Pine.

westward. (Fig. 70.) **Jersey Pine, Scrub Pine**, *Pinus virginiana* Mill.

82. Cones pointing forward towards the tip of the branch. Northern New England to Mich. and northward. (Figs. 71, 72.) **Northern Scrub Pine, Gray Pine, Scrub Pine**, *Pinus Banksiana* Lamb.
82. Cones pointing backward. Cult. and escaped.

Native in Eurasia. (Fig. 73.)

Scotch Pine, "Scotch Fir," *Pinus sylvestris* L.

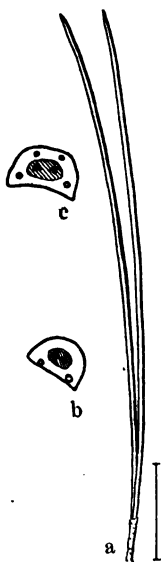


Fig. 74. Red Pine.
a. Leaf cluster.
b. Magnified cross-section of a leaf. The shaded portion is the central bundle and the small circles the resin ducts. c. A similar section of Austrian Pine leaf.

83. Cones about 2 inches long. Young branches somewhat orange-colored. Leaves usually shining, slender, and flexible; resin ducts varying in number and located close to the surface. New England to Penn. and northward. (Fig. 74a, b.) **Red Pine, Norway Pine, *Pinus resinosa* Ait.**



Fig. 73. Scotch Pine. Leaf cluster and section of a leaf.

83. Cones $2\frac{1}{2}$ to 3 inches long. Young branches grayish brown. Leaves usually dull and rigid; resin ducts varying in number and located in the interior of the leaf, midway between the surface and the central bundle. Leaves otherwise nearly as in Red Pine. Cult. Native in southeastern Europe.

(Fig. 74c.) **Austrian Pine,**
Pinus Laricio var. *au-*
striaca Endl.



LARCH.—Leaves many in a cluster, falling from the tree in the autumn. Fruit a cone, as in Pine.

84. Leaves 1 inch or less in length. Cones $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long; scales few. Central Penn. northeastward and northwestward.



**Magnified leaf
section**

Fig. 75.
American Larch.

(Fig. 75.) **American Larch, Tamarack,**

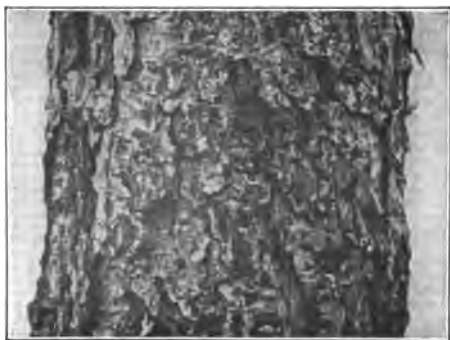


Fig. 76. European Larch.

Hackmatack, "Juniper," *Larix laricina*
(Du Roi) Koch.

46 KEY TO GENERA AND SPECIES

84. Leaves 1 inch or more in length. Cones about 1 inch long, with many scales. Cult. Native in Europe. (Fig. 76.) **European Larch**, *Larix decidua* Mill.

SPRUCE.—Leaves 4-sided or 4-angled, attached to all sides of the branch. Fruit a cone, as in Pine.

85. Young twigs hairy—86.

85. Young twigs smooth or nearly so—88.

86. Mature cones less than 3 inches long—87.

86. Mature cones more than 3 inches long. Cult. and escaped. Native in Europe. (Fig. 77.) **Norway Spruce**, *Picea Abies* (L.) Karst.



Fig. 77.
Norway Spruce.

87. Leaves $\frac{1}{3}$ to $\frac{3}{4}$ of an inch long, normally all curving upwards. Cones $1\frac{1}{4}$ to 2 inches long, commonly not remaining attached to the branch for more than one year; cone scales usually entire at the margin. Tree reaching 40 feet or more in height, usually with a pyramidal crown and growing on uplands, rarely in wet places. Penn. and central New England northwestward, and

in the mountains to Ga. (Figs. 78, 79.)

Red Spruce, Yellow Spruce, *Picea rubra*
(Du Roi) Dietr.

87. Leaves $\frac{1}{4}$ to $\frac{5}{8}$ of an inch long. Cones $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, remaining attached to the branch for many years; cone scales usually with the margin irregularly finely toothed (as if



Fig. 78.
Red Spruce.



Fig. 79. Red Spruce.

gnawed). Tree of swamps or low lands, rarely on uplands, usually with a columnar crown and less than 30 feet high. Occasionally fruiting when only 3 or 4 feet high. W. Va. northeastward and northwestward. (Fig. 80.) **Black Spruce, Swamp Spruce, Bog Spruce, *Picea mariana*** (Mill.) BSP.

88. Leaves pointed, often sharply—89.

88. Leaves blunt, less than $\frac{1}{2}$ inch long, thick,

48 KEY TO GENERA AND SPECIES

dark shining green. Occasionally cult. Native in western Asia. **Oriental Spruce, *Picea orientalis* Carr.**



Fig. 80. Black Spruce.
Showing leaf arrangement,
hairy branchlet
and leaf section.

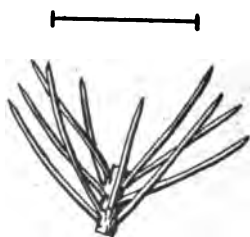


Fig. 81. Colorado
Blue Spruce.

89. Foliage bluish green or silvery—**90.**

89. Foliage green. Cones 4 to 7 inches long. Cult. and escaped. Native in Europe. (Fig. 77.)
Norway Spruce, *Picea Abies* (L.) Karst.

90. Cones $2\frac{1}{2}$ to 4 inches long; scales distinctly longer than broad, with a ragged blunt apex. Cult. Native in the Rocky Mountains. (Fig. 81.) **Colorado Blue Spruce, Silver Spruce, *Picea Menziesii* Engelm.**

90. Cones $1\frac{1}{2}$ to 2 inches long; scales rounded, not ragged. Foliage usually with an unpleasant odor. Northern New England



Fig. 82. White Spruce. Showing leaf arrangement, smooth branchlet and leaf section.

northward and westward. (Fig. 82.) **White Spruce, Single Spruce, Skunk Spruce, Cat Spruce, *Picea canadensis* (Mill.) BSP.**

WILLOW.—Leaves narrow, except in Bay-leaved Willow. Flowers in catkins. Stamens 2 to 8. Bracts not fringed. Fruit a small elongated dry pod. Seeds small, with long hairs. Many hybrids.*

91. Length of the blade not more than 3 times its width. Teeth blunt and glandular; 15 to 20

* The Glaucous Willow (*Salix discolor* Muhl.), the Shining Willow (*S. lucida* Muhl.), including also a variety of it, and the Balsam Willow (*S. balsamifera* Barratt) are generally shrubs and are not included in the key. All of these, however, may assume a tree-like habit along our northern border. See Williams in *Rhodora* 3: 277 (1901).

per inch of margin. Leaf-stalk with glands above. Stamens 3 to 5, or more. Cult. and escaped. Native in Eurasia. (Fig. 83.) **Bay-leaved Willow, *Salix pentandra* L.**



Fig. 83.
Bay-leaved
Willow.

91. Length of the blade at least 4 times its width—92.

92. Stipules usually present. No glands on the leaf-stalk. Teeth 15 to 30 per inch of margin. Stamens 3 to 5 or more—93.

92. Stipules usually not persistent. Leaf-stalk generally with glands. Normally with 2 stamens—95.

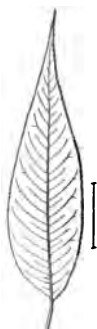


Fig. 84.
Peach-leaved
Willow.

93. Leaf-stalk more than $\frac{3}{8}$ of an inch long. Stipules dropping almost as soon as the leaf expands. Leaves from 3 to 5 times as long as wide, with a long slender point and small marginal teeth. Western N. Y., western Penn. westward. (Fig. 84.) **Peach-leaved Willow, Almondleaf Willow, *Salix amygdaloides* Anders.**

93. Leaf-stalks less than $\frac{3}{8}$ of an inch long. Stipules usually persisting nearly the entire season—94.

94. Leaves whitish and veiny beneath.

Fruit clusters 3 to 4 inches long.

Dry fruits $\frac{3}{16}$ to $\frac{1}{4}$ of an inch long, with finely granular surface.

Md. and Va. southward and westward. (Fig. 85.) **Ward's Willow**, *Salix Wardi* Bebb.

94. Leaves with a green lower surface,

although this is usually somewhat paler than the upper surface. Fruit clusters 1 to 3 inches long.

Dry fruits $\frac{1}{8}$ to $\frac{3}{16}$ of an inch long, with a smooth surface. Throughout the

northeastern states and into southern New Brunswick.

(Figs. 86, 87.) **Black Willow**, *Salix nigra* Marsh.



Fig. 86.
Black
Willow.



Fig. 85.
Ward's Wil-
low. a.
Small leaf.
b. Large
leaf.



Fig. 108. Black Walnut.

95. Marginal teeth of the leaves averaging 10 to 15 per inch—96.

95. Marginal teeth of the leaves averaging 15 to 30 per inch, blunt—97.

96. Length of the leaf-blade about 4 times the width. Marginal teeth blunt. Very variable. Cult. and escaped. Native in Eurasia. (Fig. 88.) **Crack Willow, *Salix fragilis* L.**

96. Length of the leaf-blade about 8 times the width; lower surface of the leaf pale. Marginal teeth sharp. Branches pendulous. Cult. and escaped. Native in the Caucasus. (Fig. 89.) **Weeping Willow, Napoleon's Willow, *Salix babylonica* L.**



Fig. 88.
Crack
Willow.



Fig. 89.
Weeping Willow.



Fig. 90.
White Willow.



Fig. 91.
Yellow Willow.



Fig. 92.
Blue Willow.

97. Mature leaves silky hairy on both surfaces. Twigs greenish. Cult. and escaped. Native in Europe. (Fig. 90.) **White Willow**, *Salix alba* L.
97. Mature leaves smooth. Twigs yellow or reddish. Cult. and escaped. (Fig. 91.) **Yellow Willow**, *Salix alba* var. *vitellina* (L.) Koch.
97. Mature leaves smooth and bluish green. Twigs olive-green. Cult. and escaped. (Fig. 92.) **Blue Willow**, *Salix alba* var. *caerulea* (Sm.) Koch.

POPLAR.—Leaves wide.* Flowers in catkins. Stamens 8 or more. Bracts fringed. Fruit essentially as in Willow.

98. Leaf margins irregularly lobed or toothed; lower surface white-cottony even when old. Cult. and escaped. Very variable. Native in Eurasia. (Figs. 93, 94.) **White Poplar**, **Abele**, **Silver Poplar**, *Populus alba* L.

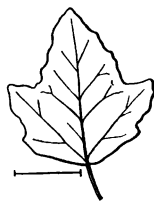


Fig. 93.
White Poplar.

98. Leaf margins regularly (or but slightly irregularly) toothed—99.
99. Teeth 5 or less per inch of margin. Through-

* Sometimes narrow in the American Aspen.



Fig. 94. White Poplar.

out the range. (Fig. 95.) **Large-toothed Aspen, Large-toothed Poplar, Poplar, Popple, *Populus grandidentata* Michx.**

99. Teeth 6 or more per inch of margin—100.



Fig. 95.
Large-toothed Aspen.



Fig. 96.
American Aspen.

100. Leaf-stalk prominently flattened in a plane at right angles to the blade—101.

100. Leaf-stalk not flattened, or but very slightly—104.

101. Blade triangular, triangularly egg-shaped, or rhombic—102.

101. Blade from broad heart-shaped or rounded to lance-shaped or oblong, usually pointed.

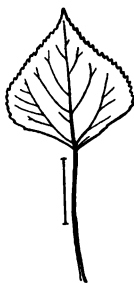


Fig. 97.
Lombardy Poplar.

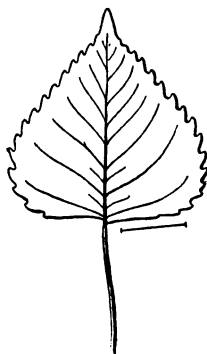


Fig. 98.
Carolina Poplar.

Penn. northward and westward. (Fig. 96.)
American Aspen, Quaking Asp, Trembling Poplar, Tremble, *Populus tremuloides* Michx.

102. Crown of the tree very narrow and spiry.

56 KEY TO GENERA AND SPECIES

Branches closely ascending. Leaves commonly broader than long. Cult. and escaped. Native in Asia. (Fig. 97.) **Lombardy Poplar**, *Populus nigra* var. *italica* Du Roi.

102. Crown of the tree not spiry—103.

103. Young twigs smooth. Western New England



Fig. 99. Carolina Poplar.

southward and westward, also cult. (Figs. 98, 99.) **Carolina Poplar**, **Cottonwood**, **Necklace Poplar**, **Cotton-tree**, *Populus deltoides* Marsh.

103. Young twigs hairy. Occasionally cult. Native in Eurasia. **Black Poplar, *Populus nigra* L.**

104. Length of blade about twice the width.* Central New England westward and north-

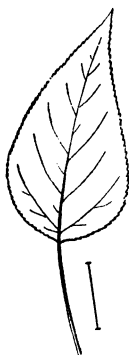


Fig. 100. Balsam Poplar.

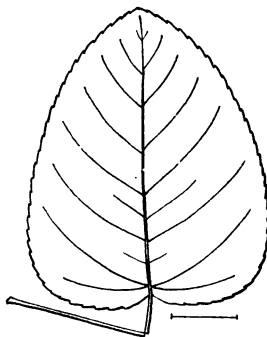


Fig. 101. Downy Poplar.

ward. (Fig. 100.) **Balsam Poplar, Tacamahac, Rough-barked Poplar, *Populus balsamifera* L.**

104. Length of blade scarcely greater than the width*—105.

* The leaves of the Balsam Poplar are sometimes wide, when they may closely resemble those of the Balm of Gilead, both of which have fragrant sticky buds. The Balm of Gilead leaf has a hairy under surface, while that of the Balsam Poplar is smooth and with a more or less metallic luster.

105. Apex of the blade blunt or rounded. Conn. southward along the coast, also in the Mis-

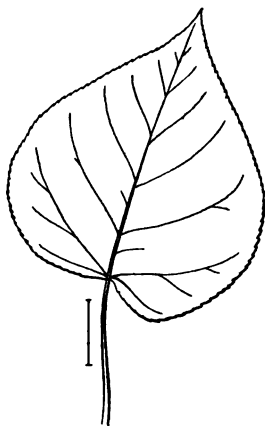


Fig. 102. Balm of Gilead.

issippi valley. (Fig. 101.) **Downy Poplar, Swamp Cottonwood, River Cottonwood, *Populus heterophylla* L.**

105. Apex of the blade tapering to a very sharp point. Cult. and escaped. Probably native in Eurasia. (Fig. 102.) **Balm of Gilead, Balsam, *Populus candicans* Ait.**

WALNUT.—Leaves compound. Leaflets averaging 11 to 23. Fruit enclosed in a husk which does not split open at maturity. Nut roughened with sharp points or ridges.

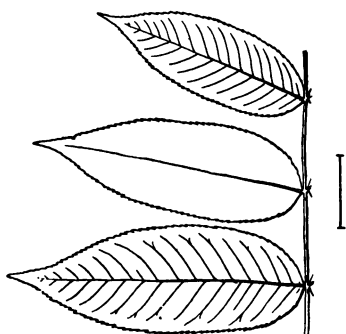


Fig. 103. Butternut.

Pith of twigs appearing as if made up of a row of diaphragms when cut longitudinally.

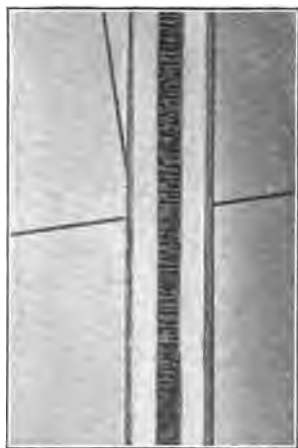


Fig. 104. Butternut. Showing pith in split twig.

60 KEY TO GENERA AND SPECIES

106. Leaflets 11 to 17, sticky-hairy, as are also the leaf-stalks and young fruits. Fruit oblong. New Brunswick southwestward. (Figs. 103, 104, 105.) **Butternut, White Walnut, Oilnut, *Juglans cinerea* L.**



Fig. 105. Butternut.

106. Leaflets 15 to 23, not sticky. Fruit globular. Southwestern New England and central N. Y. southward and westward, also cult. (Figs. 106, 107, 108.) **Black Walnut, Walnut, *Juglans nigra* L.**

HICKORY.—Leaves compound. Leaflets 5 to 11. Fruit husk regularly splitting into 4 parts at maturity. Nut smooth.

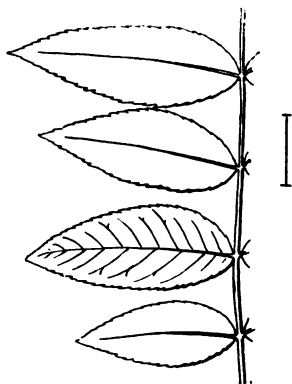


Fig. 106. Black Walnut.

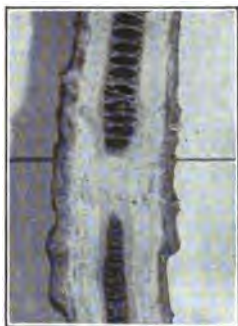


Fig. 107. Black Walnut.
Showing the pith in a
split twig.



Fig. 108. Black Walnut.

107. Leaflets averaging 5 to 7—108.

107. Leaflets averaging 7 to 11—110.



Fig. 109. Shag-bark Hickory (lowest pair of leaflets usually pointing backwards).

108. Leaflets usually 5, the lowest pair much smaller. Husk of fruit more than $\frac{1}{8}$ of an inch thick. Kernel of seed sweet. Bark of old trunks separating into loose plates. Central Me. to southern Quebec and southwestward. (Figs. 109, 110.) **Shag-bark Hickory, Shell-bark Hickory, *Carya ovata* (Mill.) K. Koch.**

108. Leaflets 5 or 7. Husk of fruit less than $\frac{1}{8}$ of an inch thick—109.



Fig. 110. Shag-bark Hickory.

109. Fruit oblong, an inch or more long. Kernel of seed bitter. Bark in close rough scaly ridges. Central New England, southern

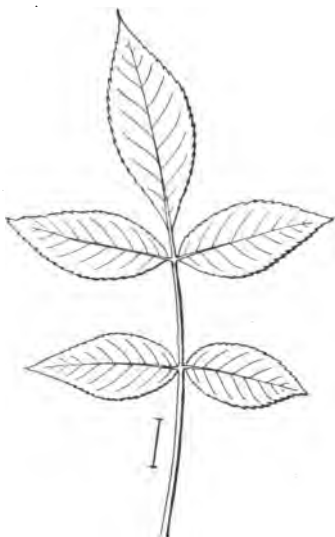


Fig. 111. Pignut.



Fig. 112. Small-fruited Hickory.



Fig. 113. Pignut.

Ontario southward and westward. (Figs. 111, 113.) **Pignut, Brown Hickory**, *Carya glabra* (Mill.) Spach.

109. Fruit globular, less than an inch in length. Kernel sweetish. Bark rough and somewhat shaggy. Central New England south-



Fig. 114. Small-fruited Hickory.

ward and westward. (Figs. 112, 114.) **Small-fruited Hickory, Small Pignut, Little Shag-bark Hickory**, *Carya microcarpa* Nutt.

110. Leaflets glandular-hairy, at least beneath, with a resinous fragrance when crushed. Fruit husk more than $\frac{1}{8}$ of an inch thick. Bark hard and close, not separating into

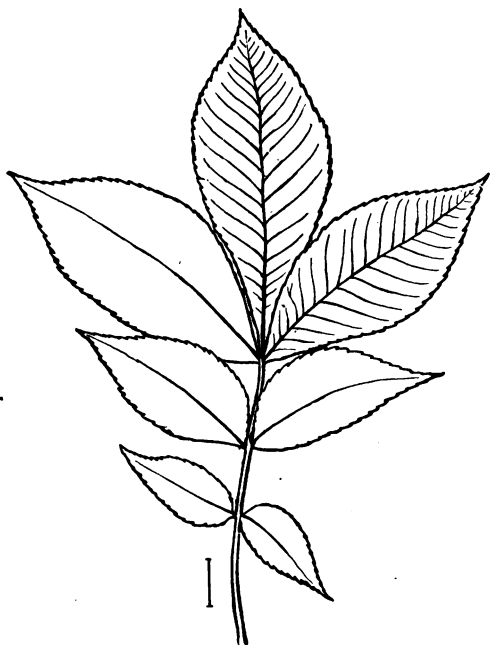


Fig. 115. Mockernut.



Fig. 116. Mockernut.

long loose plates. Nut about 1 inch across, with a thick shell. Kernel of seed sweet. Southern New England southward and westward. (Figs. 115, 116.) **Mockernut, White-heart Hickory, Bullnut, *Carya alba* (L.) K. Koch.**

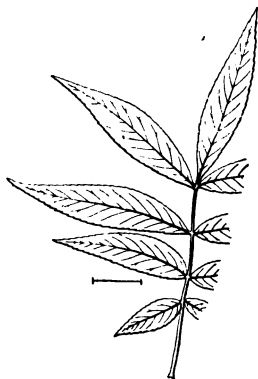


Fig. 117. Bitternut Hickory.

110. Leaflets finely hairy only when young. Fruit husk less than $\frac{1}{8}$ of an inch thick. Bark hard and close, not separating into loose plates. Nut hardly 1 inch across, with a thin shell. Kernel of seed bitter. Southwestern Me. southward and westward. (Fig. 117.) **Bitternut, Swamp Hickory, *Carya cordiformis* (Wang.) K. Koch.**

68 **KEY TO GENERA AND SPECIES**

110. Leaflets usually somewhat downy beneath.
Fruit husk more than $\frac{1}{8}$ of an inch thick.
Bark of medium sized trunks forming long



Fig. 118. Big Shell-bark Hickory.

loose plates. Nut $1\frac{1}{4}$ to 2 inches across, with a thick shell. Kernel of seed sweet. Western N. Y. southwestward. (Fig. 118.)
Big Shell-bark, King Nut, *Carya laciniosa*
(Michx. f.) Loud.

BIRCH.—Leaves simple, alternate. Fruit clusters cone-like. Nuts small, winged.

- III. Bark dark colored, not separable into thin papery layers. Young twigs strongly spicy-aromatic when the bark is bruised or broken. Western Me. southward and westward. (Figs. 119, 120.) **Black Birch, Cherry Birch, Sweet Birch, *Betula lenta* L.**



Fig. 119. Black Birch.

- III. Bark light colored (usually white, yellowish, or pinkish), rarely dark, except in young trees;



Fig. 120. Black Birch. Old trunk.

generally separating, or separable, on medium sized trunks, into thin papery layers—112.



Fig. 121. Yellow Birch.



Fig. 123.
River
Birch.



Fig. 122. Yellow Birch.



Fig. 124. River Birch. Old trunk.

- 112.** Papery or filmy bark yellowish, silvery-gray, or straw-color, and usually shining. Bark of young twigs spicy-aromatic when bruised. Newfoundland westward and southwestward. (Figs. 121, 122.) **Yellow Birch, Silver Birch, *Betula lutea* Michx. f.**



Fig. 125. River Birch. Young trunk.

- 112.** Papery or filmy bark varying from chalky-white or pink to bronze. Bark of young twigs not distinctly spicy-aromatic when bruised—**113.**
- 113.** Papery bark pinkish or salmon-colored, usually separating naturally into filmy coils or

fringes on trunks and branches ranging in size from 2 to 8 inches, or more, in diameter. Leaves more or less rhombic, occasionally



Fig. 126.
Cut-leaved
Birch.



Fig. 127.
Gray
Birch.

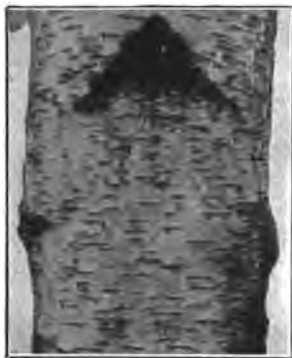


Fig. 128. Gray Birch.



Fig. 129. Cut-leaved Birch.

somewhat triangular, almost never of a regular egg-shaped outline. N. J. south-

ward and westward, also locally in eastern Mass. (Figs. 123, 124, 125.) **River Birch, Red Birch, *Betula nigra* L.**

113. Papery bark white or whitish, rarely as dark as bronze; in certain species not separating spontaneously into filmy coils or fringes—
114.



Fig. 130. White Birch
—Blue Birch.

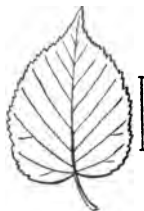


Fig. 131. Cordate-leaved
Birch.

114. Leaves deeply cut, often into narrow divisions. Cult. (Figs. 126, 129.) **Cut-leaved Birch, *Betula pendula* var. *dalecarlica* L.**
114. Leaves not deeply cut, distinctly triangular, usually with a long tapering apex. Prince Edwards Island to Md. (Figs. 127, 128.) **Gray Birch, White Birch, Poverty Birch, Old-field Birch, *Betula populifolia* Marsh.**
114. Leaves neither deeply cut nor triangular—115.

115. Young branches perfectly smooth. Northern New England, Quebec, and northwestward, (Fig. 130.) **White Birch, Blue Birch, *Betula pendula* Roth.**

115. Young branches minutely hairy—116.



Fig. 132. Cordate-leaved Birch.

116. Branches pendulous.* Cult. **Weeping Birch, *Betula alba* var. *pendula* Hort.**

116. Branches not pendulous—117.

117. Leaves rounded or slightly wedge-shaped at base—118.

* *Betula alba* var. *glutinosa* (Wallr.) Traut., with pendulous branches, is local near Mt. Katahdin and in Washington Co., Me.

117. Leaves broadly egg-shaped, heart-shaped at base. Newfoundland to northern New England and northward. (Figs. 131, 132). **Cordate-leaved Birch**, *Betula alba* var. *cordifolia* (Regel) Fernald.



Fig. 133. European Paper Birch.

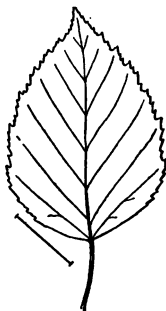


Fig. 134. American Canoe Birch.

118. Leaves $1\frac{1}{4}$ to $2\frac{1}{2}$ inches long. Newfoundland and northern New England and northward, also cult. (Fig. 133.) **European Paper Birch**, *Betula alba* L.



Fig. 135. American Canoe Birch.

118. Leaves $2\frac{1}{2}$ to $3\frac{1}{2}$ inches long. Newfoundland to Penn., thence westward across the

continent. (Figs. 134, 135.) **American Canoe Birch, Paper Birch, Canoe Birch, White Birch, *Betula alba* var. *papyrifera* (Marsh.) Spach.**

ALDER.—Shrubby, or occasionally small trees. Flowers in catkins. Fruit clusters cone-like.

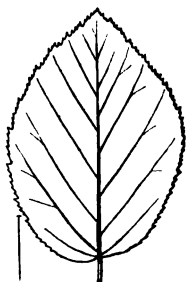


Fig. 136. Downy Green Alder.

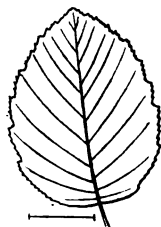


Fig. 137. Speckled Alder.



Fig. 138. European Black Alder.

119. Leaves broadest at the middle or below—**120.**

119. Leaves broadest above the middle—**121.**

120. Flowers in the spring. Leaves densely soft-hairy beneath. Branchlets hairy. Mature fruit $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long. Newfoundland to western Mass. and N. Y. (Fig. 136.)

Downy Green Alder, *Alnus mollis* Fernald.

120. Flowers in the spring. Leaves somewhat hairy or rusty beneath, dark green above,

with impressed veins. Mature fruit $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long. Usually a shrub. Penn. and northward. (Fig. 137. Commonly more strongly and irregularly lobed than shown in the illustration.) **Speckled Alder**, **Hoary Alder**, *Alnus incana* (L.) Moench.

120. Flowers in the fall. Leaves usually broadest at the middle, and smooth on both surfaces,

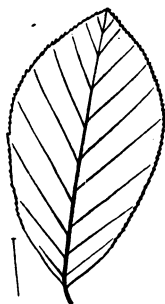


Fig. 139.
Smooth
Alder.



Fig. 140.
Fern-leaved
Beech.



Fig. 141. Pur-
ple-leaved
Beech.

or somewhat rusty beneath. Mature fruit $\frac{3}{4}$ to 1 inch long. Known in the eastern states only from Del. and eastern Md. **Seaside Alder**, *Alnus maritima* (Marsh.) Muhl.

121. Leaves fan-shaped or rounded. Margins coarsely toothed. Cult. and escaped. Na-



Fig. 142. Purple-leaved Beech (grafted).

tive in Eurasia and Africa.

(Fig. 138.) **European Black Alder**, *Alnus vulgaris* Hill.

121. Leaves conspicuously longer than broad. Margins with very small teeth. Me. southward along the coast. (Fig. 139.) **Smooth Alder**, *Alnus rugosa* (Du Roi) Spreng.



Fig. 143. American Beech.

BEECH.—Leaves simple, alternate. Bark light gray, without furrows.

122. Leaves very variable, commonly deeply cut into slender divisions. Cult. (Fig. 140.)

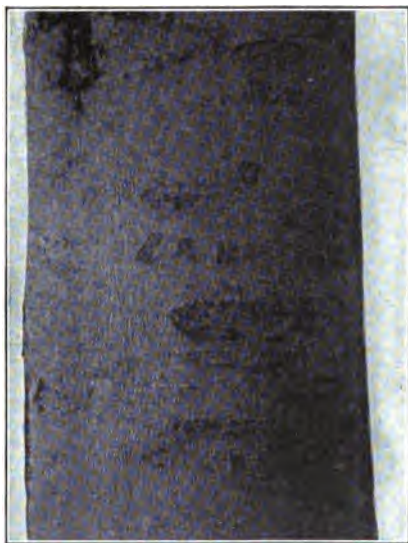


Fig. 144. American Beech.

Fern-leaved Beech, *Fagus sylvatica* var. *heterophylla* Loud.

122. Leaves not deeply cut—**123.**

123. Leaves purple, red, or even darker. Cult. (Figs. 141, 142.) **Purple-leaved Beech, *Fagus sylvatica* var. *purpurea* Ait.**

123. Leaves green—124.

124. With 9 to 14 pairs of side veins in the leaf, each vein ending in a distinct marginal tooth. Leaves $2\frac{1}{2}$ to 5 inches long, width about half the length. New Brunswick southward and westward. (Figs. 143, 144.) **American Beech, Beech, Red Beech, White Beech, *Fagus grandifolia* Ehrh.**

NOTE.—The American Beech normally has yellowish or grayish fruit with elongated prickles. The variety *caroliniana*, from N. J. southward, has a dull red fruit and short prickles.

124. With 5 to 9 pairs of side veins, each vein ending either in or between small or blunt teeth, the latter often entirely absent and the margin merely wavy. Leaves 2 to 4 inches long, width $\frac{3}{4}$ the length. Cult. Native of Europe. (Fig. 145.)



Fig. 145.
European
Beech.

European Beech, *Fagus sylvatica* L.

NOTE.—The common *Weeping Beech* is a variety of the European Beech, with drooping or pendulous branches.

CHESTNUT.—Leaves long, with a bristle tipped tooth at the end of each side vein. Fruit a bur, an inch or more thick, usually containing from 1 to 3 pointed nuts.

- 125.** Nut usually $\frac{1}{2}$ to $\frac{3}{4}$ of an inch broad, and with 2 or 3 in a bur. Leaves smooth. Southwestern Me. southward and westward. (Figs. 146, 147.) **American Chestnut, Chestnut, *Castanea dentata*** (Marsh.) Borkh.



Fig. 146. American Chestnut.



Fig. 147. American Chestnut.

- 125.** Nut usually less than $\frac{1}{2}$ inch broad, and solitary in the bur. Leaves downy-hairy beneath. Usually a shrub. N. J. southward and westward. (Fig. 148.) **Chinquapin, Dwarf Chestnut, *Castanea pumila*** (L.) Mill.

- 125.** Nut usually more than $\frac{7}{8}$ of an inch broad. Cult. (The leaves of this species are shaped

much like those of the American Chestnut, except at the variable base.) Native in Eurasia and Africa. **European Chestnut**, *Castanea sativa* Mill.



Fig. 148.
Chinquapin.

NOTE.—Certain *Japanese Chestnuts* (Fig.



Fig. 149.
Japanese
Chestnut.

149) are occasionally cultivated within our range; these can usually be recognized by the very large bur, sometimes 4 or more inches in thickness, also by the small but prominently bristle-tipped teeth of the leaf margin, and the rounded or often auriculate base of the blade.

- OAK.—Leaves simple, alternate. Fruit a nut surrounded at the base by a cup composed of closely overlapping scales; commonly known as an acorn.

126. Leaves without lobes or marginal teeth—127.

126. Leaves either lobed or toothed, or both—128.

127. Mature leaves of fruiting branches usually an inch or more wide near the middle, and about 3 times as long as broad.* Penn.

* Some leaves may occasionally be somewhat lobed.

westward and southward, also local in eastern Mass. (Figs. 150, 151.) **Laurel Oak, Shingle Oak, *Quercus imbricaria* Michx.**

127. Mature leaves of fruiting branches less than



Fig. 150.
Laurel Oak.



Fig. 151. Laurel Oak.

an inch wide at the middle, and about 5 times as long as broad.* N. J. southward and westward. (Fig. 152.) **Willow Oak, Peach Oak, *Quercus phellos* L.**

127. Mature leaves of fruiting branches usually broad and rounded in the upper third, often with a tendency to become 3-lobed near the apex.* Del. southward, also in the lower Mississippi valley. (Fig. 153.) **Water Oak, *Quercus nigra* L.**



Fig. 152.
Willow
Oak.

*Leaves of vigorous shoots are often strongly and sharply lobed.

84 KEY TO GENERA AND SPECIES

128. Lobes or marginal teeth ending in a bristle—
129.

128. Lobes or marginal teeth not ending in a bristle—135.



Fig. 153.
Water Oak.

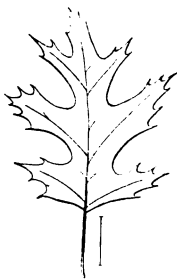


Fig. 154.
Black Oak.

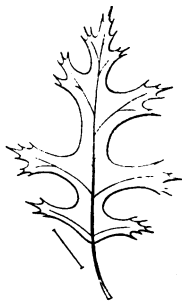


Fig. 155.
Scarlet Oak.



Fig. 156.
Pin Oak.



Fig. 157. Black Oak.

129. Lower surface of mature leaves smooth, or
nearly so—130.

129. Lower surface of mature leaves hairy—133.

130. Acorn cup covering about half the nut—
131.

130. Acorn cup shallow and broad, covering considerably less than half the nut—132.

131. Inner (or upper) thin scales of the cup finely hairy, and the tips loosely overlapping. Buds usually pointed and woolly-hairy all over, somewhat angular in cross section. Inner bark yellowish-orange and very bitter. Southern Me. southward and westward. (Figs. 154,

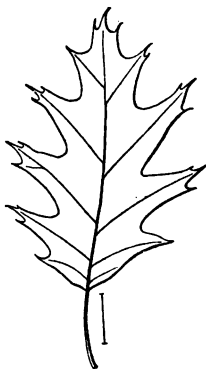


Fig. 158. Red Oak.

157.) **Black Oak, Yellow-bark Oak, Yellow Oak, *Quercus velutina* Lam.**

131. Inner (or upper) thin scales of the cup smooth or essentially so, and the tips very snugly overlapping. Buds usually blunt, hairy only near the tip, not usually angular in cross section. Inner bark reddish, not bitter. Southern Me. southward and westward. (Fig. 155.) **Scarlet Oak, *Quercus coccinea* Muench.***

* See note on page 86.

132. Acorn small, less than $\frac{3}{4}$ of an inch long.

Mass. southward and westward. (Fig. 156.)

Pin Oak, *Quercus palustris* Muench.

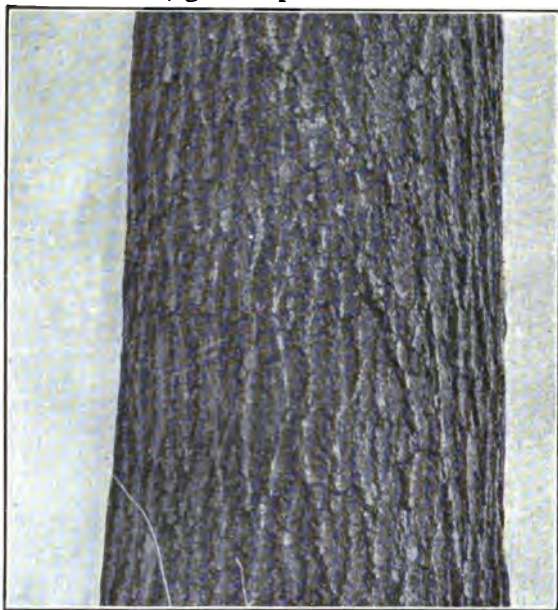


Fig. 159. Red Oak.

132. Acorn large, more than $\frac{3}{4}$ of an inch long.

Throughout our range. (Figs. 158, 159.)

Red Oak, *Quercus rubra* L.*

* The Gray Oak (*Quercus rubra* var. *ambigua* (Michx. f.) Fernald), with the fruit of the Scarlet Oak and the foliage of the Red Oak, occurs along the northern range of the Red Oak and is usually regarded as a variation of that species.

133. Leaf lobes usually longer than broad and tapering more or less regularly to long sharp points. N. J. southward, also in the lower



Fig. 160. Spanish Oak.

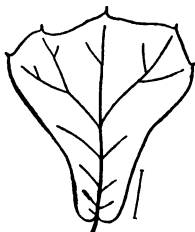
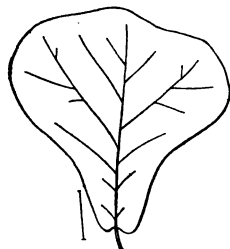
Mississippi valley. (Fig. 160.) **Spanish Oak**, *Quercus falcata* Michx.

133. Leaf lobes usually broader than long—134.

134. Blade not six times as long as the leaf-stalk. Leaves generally angularly lobed, broadest near the middle, grayish white-hairy beneath. Northeastern states. (Fig. 161.) **Scrub Oak, Bear Oak, Barren Oak**, *Quercus ilicifolia* Wang.

134. Blade more than six times as long as the leaf-

88 KEY TO GENERA AND SPECIES

Fig. 161.
Scrub Oak.Fig. 162. Black Jack
Oak (with bristles).Fig. 163. Black Jack
Oak (without bristles).

stalk. Leaves greatly broadened at the apex, usually with no pronounced lobes; lower surface rusty-hairy. Long Island southward and westward. (Figs. 162, 163.)

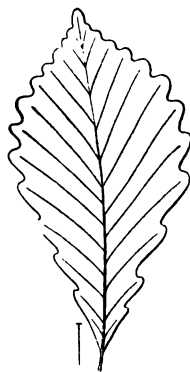
Black Jack Oak, Jack Oak, *Quercus marilandica* Muench.

135. Lower surface of the mature leaves smooth, or nearly so—136.

135. Lower surface of the mature leaves hairy—140.

136. Leaf-margins with many coarse rounded teeth which do not reach more than $\frac{1}{4}$ of the distance to the midrib—137.

136. Leaf-margins lobed—138.

Fig. 164.
Chestnut Oak.

- 137.** Mature acorn cups more than 1 inch broad.
 Del., Md., southward. The leaves of this
 species are much like those of a Chestnut
 Oak (See Fig. 164), but with pointed teeth.
Cow Oak, Basket Oak *Quercus Michauxii*
 Nutt.
- 137.** Mature acorn cups less than 1 inch broad.



Fig. 165. Chestnut Oak.

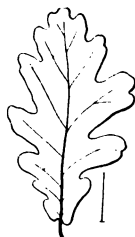


Fig. 166.
English Oak.

Southern Me. and N. H. southward. (Figs.
 164, 165.) **Chestnut Oak, Rock Oak,**
Rock Chestnut Oak, *Quercus Prinus* L.

- 138.** Base of the blade pointed—**139.**
- 138.** Base of the blade ear-shaped (auriculate).
 Cult. Native in Europe. (Figs. 166, 167.)
English Oak, *Quercus Robur* L.

NOTE.—A less common variety of the English Oak (var. *sessiliflora*) occasionally has a tapering base to the blade, when it closely resembles the leaf of the White Oak. The tree may generally be distinguished from the latter by the rather firm prominently furrowed



Fig. 167. English Oak.

dark bark; the bark of the White Oak being light gray with a tendency to become flaky or scaly on trunks and branches from 4 to 10 inches in diameter, rather than furrowed.

139. Acorn broader than high. Southern N. J. southward and westward. (Fig. 168.)
Overcup Oak, Swamp Post Oak, Water White Oak, *Quercus lyrata* Walt.
 139. Acorn higher than broad. Central New

England southward and westward. (Figs. 169, 170.) **White Oak**, *Quercus alba* L.

140. Deepest marginal indentations usually not reaching more than $\frac{1}{3}$ of the distance to the midrib—141.

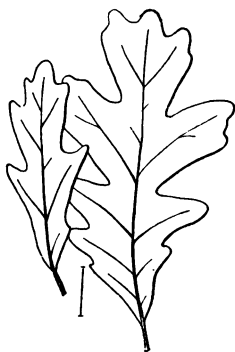


Fig. 168. Overcup Oak.



Fig. 169. White Oak.

140. Deepest marginal indentations usually reaching $\frac{1}{2}$ of the distance to the midrib or more, at least in most of the leaves—143.

141. Fruit-stalk much longer than the leaf-stalk. Southern Me. southward and westward. (Fig. 171.) **Swamp White Oak**, **Swamp Oak**, *Quercus bicolor* Willd.

141. Fruit-stalk shorter than the leaf-stalk—142.

142. Leaf-margins with many coarse rounded teeth.
Leaf-base tapering. Southern Me. southward and westward. (Figs. 164, 165.)
Chestnut Oak, Rock Oak, Rock Chestnut Oak, *Quercus Prinus* L.
142. Leaf-margins with many coarse sharp teeth.



Fig. 170. White Oak.

Leaf-base tapering. Vt. and southward, mainly along the mountains. (Fig. 172. Leaves often wider than shown in the illustration.) **Yellow Oak, Chinquapin Oak, Chestnut Oak, *Quercus Muhlenbergii* Engelm.**

142. Leaf-margins with angles or lobes rather than

teeth. Leaf-base heart-shaped or auriculate.
Long Island southward and westward.
(Figs. 162, 163.) **Black Jack Oak, Jack
Oak, *Quercus marilandica* Muench.**

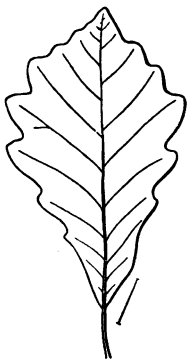


Fig. 171. Swamp
White Oak.



Fig. 172.
Yellow Oak.



Fig. 173.
Bur Oak.



Fig. 174. Bur Oak.

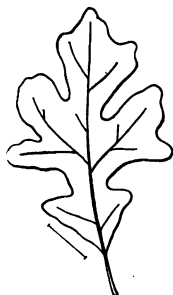


Fig. 175. Post Oak.

143. Scales of the cup (at least the inner ones)
with long points or awns. Cup usually

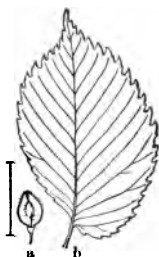


Fig. 176. American Elm. a. Fruit. b. Leaf.

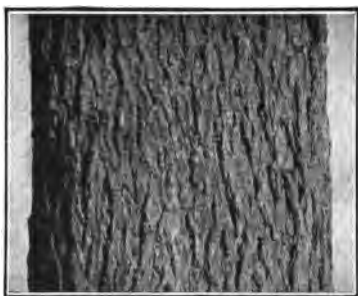


Fig. 177. American Elm.

covering more than half of the nut. Nova Scotia to Manitoba and southward to Penn. and Tenn. Rather local in New England. (Figs. 173, 174.) **Bur Oak, Mossy-cup Oak, Overcup Oak, *Quercus macrocarpa* Michx.**

143. Scales of the cup not awned.

Cup usually covering less than half of the nut. Mass. southward and westward. (Fig. 175.) **Post Oak, Box White Oak, *Quercus stellata* Wang.**

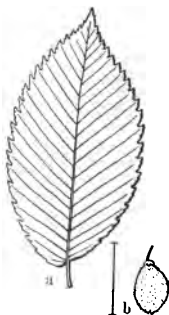


Fig. 178. Cork Elm. a. Leaf. b. Fruit.

ELM.—Leaves simple, alternate, with straight side veins, doubly-toothed margins, and an unsymmetrical base. Fruit strongly

flattened, with a broad thin wing surrounding the single seed, the wing notched at the apex, and the notch usually closed above.

- 144.** Mature fruit hairy-fringed along the margin—
145.



Fig. 179. Cork Elm.

- 144.** Mature fruit not hairy-fringed along the margin—**146.**
- 145.** Mature fruit less than $\frac{1}{2}$ inch long, surfaces without hairs. Side veins of the leaf usually

less than 18 pairs. Throughout our range.
(Figs. 176, 177.) **American Elm, White Elm, Elm, *Ulmus americana* L.**

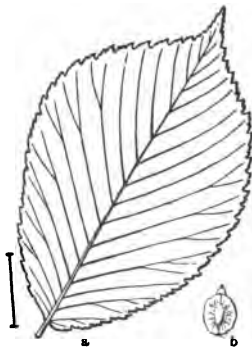


Fig. 180. Slippery Elm. a. Leaf. b. Fruit.



Fig. 181. Slippery Elm. Old Tree.

145. Mature fruit more than $\frac{1}{2}$ inch long, slightly hairy all over. Side veins of the leaf usually

more than 18 pairs. Western New England westward and southward. (Figs. 178, 179.)

Cork Elm, Rock Elm, Northern Cork Elm,
Ulmus racemosa Thomas.

146. Mature fruit not hairy
—147.

146. Seed portion of the fruit hairy, elsewhere without hairs. Central New England southward and westward. (Figs. 180, 181.) **Slippery Elm, Red Elm,** *Ulmus fulva* Michx.

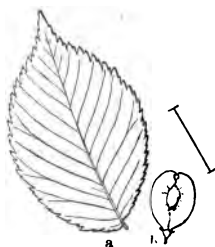


Fig. 182. English Elm.
a. Leaf. b. Fruit.



Fig. 183. English Elm.

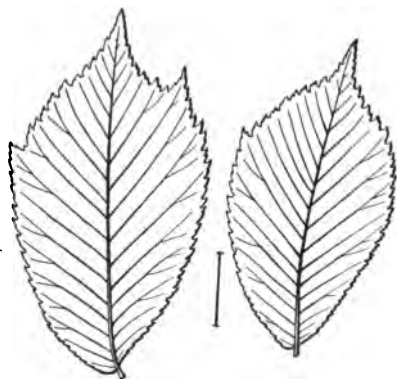


Fig. 184. Wych Elm.

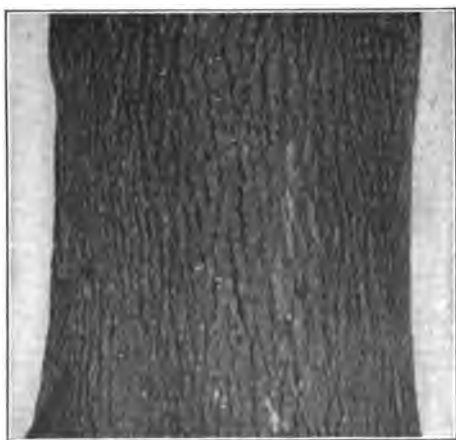


Fig. 185. Wych Elm.

- 147.** Veins in the longer side of the leaf 11 or less.
Cult. Native in Eurasia and northern Africa. (Figs. 182, 183.) **English Elm**,
Ulmus campestris L.
- 147.** Veins in the longer side of the leaf 12 or more.
Leaves sometimes slightly lobed above.
Occasionally cult. Native in Eurasia.
(Figs. 184, 185.) **Wych Elm, Scotch Elm**,
Ulmus montana With.

MULBERRY.—Leaves alternate, broad, often lobed.
Fruit in general appearance suggesting a



Fig. 186. White Mulberry.

blackberry (except perhaps in color), though technically quite different.

- 148.** Leaves smooth, usually shining. Fruit whit-

ish or pinkish. Cult. and escaped. Native in China. (Figs. 186, 187, 188.) **White Mulberry**, *Morus alba* L.

148. Leaves rough, usually downy-hairy beneath. Fruit dark purple or nearly black. Western New England southward and westward also cult. (Figs. 189, 190.) **Red Mulberry, Black Mulberry**, *Morus rubra* L.

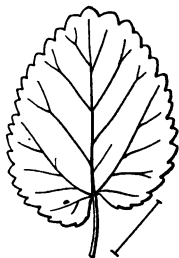


Fig. 187. White Mulberry.

MAGNOLIA.—Leaves of many species very large. Margins without teeth. Flowers large and



Fig. 188. White Mulberry.

conspicuous. Fruit cone-like. Seeds hanging from the mature fruit by slender threads.

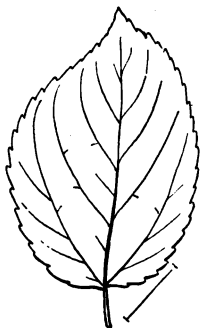


Fig. 189. Red Mulberry.



Fig. 190. Red Mulberry.

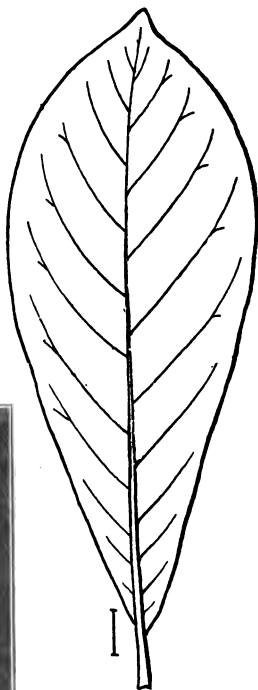


Fig. 191. Umbrella Tree.

102 KEY TO GENERA AND SPECIES

149. Flowers appearing before the leaves in early spring. Cultivated for ornament only. Small trees or shrubs. Various **Chinese and Japanese Magnolias**.
149. Flowers not appearing until the leaves have expanded. Native in the eastern U. S. and cult.—150.
150. Leaves 1 to 2 feet long, pointed at both ends, crowded at the ends of the branches in umbrella-like clusters. Flowers 3 to 5 inches long. Southern Penn. southward and westward. (Fig. 191.) **Umbrella Tree, *Magnolia tripetala* L.**
150. Leaves not crowded at the ends of the branches, but scattered along the sides —151.
151. Leaves 3 to 5 inches long, blunt at the apex, whitish beneath. Flowers globular, fragrant, white, 2 inches long. Usually a shrub. N. Y. southward, also local in eastern Mass. (Fig. 192.) **Sweet Bay, Sweet Magnolia, *Magnolia virginiana* L.**
151. Leaves 6 to 10 inches long, pointed at the apex, not conspicuously whitened beneath. Flowers shaped like a narrow bell,

greenish yellow, 2 inches long. Western N. Y. southward and westward. (Fig. 193.) **Cucumber Tree**, *Magnolia acuminata* L.

151. Leaves 1 to 3 feet long, somewhat clustered, heart-shaped at the base, whitened and

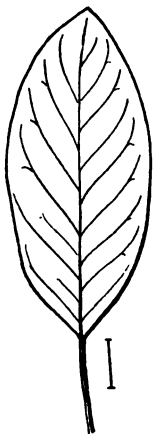


Fig. 192. Sweet Bay.

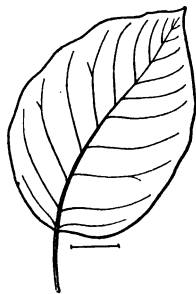


Fig. 193. Cucumber Tree.

hairy beneath. Flowers broad bell-shaped, white (with purple spots at the base), about 6 inches long. Ky. southward. (Fig. 194.) **Great-leaved Magnolia**, **Great-leaved Umbrella Tree**, *Magnolia macrophylla* Michx.

APPLE, PEAR, QUINCE.—Leaves simple. Fruit fleshy, containing 5 thin-walled compartments with about 2 seeds in each.

152. Leaf margins toothed—153.

152. Leaf margins not toothed, lower surface woolly. Cult. (Fig. 195.) **Quince**, *Pyrus Cydonia* L.

153. Leaves woolly or velvety-hairy beneath. Fruit globular, with a depression at both ends. Cult. and occasionally growing wild. (Figs. 196, 197.) **Apple**, *Pyrus Malus* L.

153. Leaves smooth beneath, or nearly so —154.

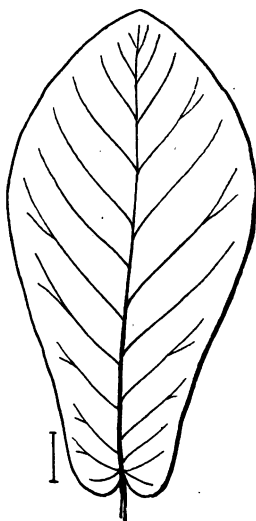


Fig. 194. Great-leaved Magnolia.

154. Some of the leaves very irregularly toothed, or even lobed and toothed. Branches sometimes prolonged into short thorns. Fruit an inch or more long, with a depression at each end. N. J. westward and southward.

(Fig. 198.) **American Crab,**
Sweet Crab, *Pyrus coronaria* L.

154. Leaves somewhat regularly toothed, not lobed—155.



155. Fruit narrower towards the base.
Cult. (Figs. 199, 201.) **Pear,**
Common Pear, *Pyrus communis* L.

Fig. 195.
Quince.

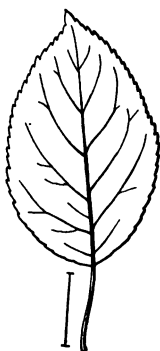


Fig. 196. Apple.



Fig. 197. Apple.

155. Fruit about an inch in diameter, not narrower towards the base—156.

156. Fruit yellow with a red cheek. Cult. and occasionally escaped in New England. Native in Asia. (Fig. 200.) **Siberian Crab,** *Pyrus baccata* L.

156. Fruit greenish. Along rivers, N. J. southward and westward. (Fig. 202.) **Narrow-**

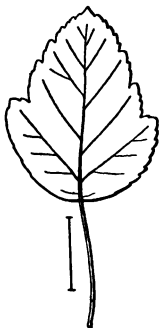


Fig. 198.
American Crab.

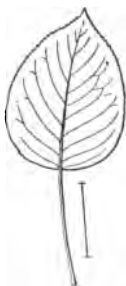


Fig. 199.
Pear.

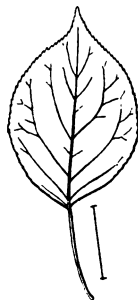


Fig. 200.
Siberian Crab.



Fig. 201. Pear.



Fig. 202.
Narrow-
leaf Crab.

leaf Crab, Southern Crab Apple, *Pyrus angustifolia* Ait.

MOUNTAIN ASH.—Leaves compound. Fruit red, fleshy, with a core like an Apple or Pear.*

157. Fruit about $\frac{1}{2}$ inch thick, in flat-topped clusters. Leaflets smooth, lance-shaped,



Fig. 203. American Mountain Ash.

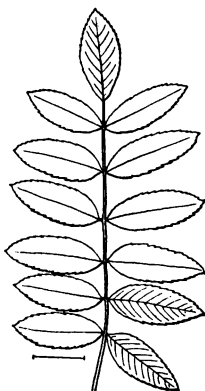


Fig. 204. Western Mountain Ash.



Fig. 205. European Mountain Ash.

taper-pointed. Labrador to northern New England and northwestward. (Fig. 203.) **American Mountain Ash, Round-wood,** *Pyrus americana* (Marsh.) DC.

* *Pyrus hybrida* L., with the leaves compounded (pinnately) only at the base, is a local escape in Maine.

157. Fruit about $\frac{1}{3}$ of an inch thick, in flat-topped clusters. Leaflets smooth, oblong, abruptly pointed. Labrador through central Me. westward and northward; also cult. (Fig. 204.) **Western Mountain Ash, Elder-leaved Mountain Ash, *Pyrus sitchensis*** (Roem.) Piper.
157. Fruit about $\frac{1}{2}$ inch thick, in convex clusters. Leaflets oblong, usually blunt, lower surface and leaf-stalks hairy. Cult. and escaped. Native in Eurasia. (Fig. 205.) **European Mountain Ash, Rowan Tree, *Pyrus Aucuparia* (L.) Ehrh.**

JUNEBERRY.—Fruit fleshy, rarely more than $\frac{3}{8}$ of an inch thick, containing 10 one-seeded compartments at maturity.

158. Mature leaves smooth,* usually rounded or heart-shaped at base and pointed at

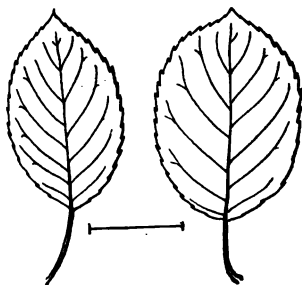


Fig. 206. Shad Bush.

* A variety of the Shad Bush (var. *tomentula* Sarg.), from southwestern Maine, southward and westward, usually has the leaves hairy when mature.

apex. Petals white, $\frac{1}{2}$ inch or more long. Throughout our range. (Fig. 206.) **Shad Bush, Service Berry, *Amelanchier canadensis* (L.) Medic.**

- 158.** Mature leaves usually rounded at both ends or with an abrupt bristle-like apex; commonly more or less hairy until old. Petals white, less than $\frac{1}{2}$ inch long. New Brunswick southward and westward. (Fig. 207.)

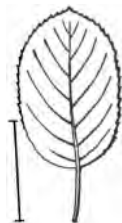


Fig. 207.
Dwarf Juneberry.

Dwarf Juneberry, *Amelanchier oblongifolia* (T. & G.) Roem.

THORN.—Leaves simple. Fruit fleshy, globular, rarely more than $\frac{3}{4}$ of an inch thick. Seeds 1 to 5, each enclosed in a bony seed-like stone. Many species are recognized. Mostly thorny shrubs, but the following occasionally become small trees. Mature fruit is generally essential for identification.

- 159.** Leaves deeply cut into several sparingly toothed segments. Fruit usually with one stone. Cult. and escaped. Native in Eurasia and northern Africa. (Fig. 208.) **English Hawthorn, *Crataegus monogyna* Jacq.**

- 159.** Leaves not deeply cut, indentations reaching

110 KEY TO GENERA AND SPECIES

less than half way to the midrib. Fruit with 2 or more stones—160.

160. Stones 2 or 3, each with 2 prominent depressions on the inner side. Leaves leathery, shining above. Nova Scotia westward and



Fig. 208. English Hawthorn.

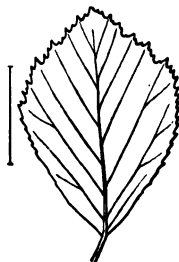


Fig. 209. *Crataegus macracantha*.

southward. (Fig. 209.) *Crataegus macracantha* Lodd.

160. Stones without deep depressions on the inner side—161.

161. Flowers and fruits generally 3 to 7 in a cluster. Leaf-stalks with glands. Central New England to N. C. **Scarlet Thorn, Scarlet Haw, Red Haw, White Thorn**, *Crataegus coccinea* L.

161. Flowers generally more than 7 in a cluster—
162.



Fig. 210. Cock-spur Thorn.



Fig. 211. *Crataegus pruinosa*.

162. Leaves broadest above the middle. Western New England southward and westward. Also cult. (Fig. 210.) **Cock-spur Thorn, Red Haw, Newcastle Thorn, Thorn Plum, *Crataegus Crus-galli* L.**
162. Leaves broadest at the middle or below—163.
163. Mature leaves smooth—164.
163. Mature leaves hairy, at least along the veins beneath—168.
164. Leaves broadest at the middle. Vt. *Crataegus Oakesiana* Eggl.
164. Leaves broadest towards the base—165.
165. Fruit firm when ripe. Leaves bluish green. Western New England southward and

112 KEY TO GENERA AND SPECIES

- westward. (Fig. 211.) *Crataegus pruinosa* (Wendl.) C. Koch.
165. Fruit soft when ripe—166.
166. Calyx lobes finely toothed. Stones usually 4 or 5—167.
166. Calyx lobes toothed. Stones usually 3 or 4. Nova Scotia to the Great Lakes and southward in the mountains. *Crataegus macrosperma* Ashe.
167. Upper surface of the mature leaves smooth. R. I. to Montreal southward and westward. *Crataegus coccinioides* var. *dilatata* (Sarg.) Eggl.
167. Upper surface of the mature leaves rough. Conn. to Del. and Ill. *Crataegus pedicillata* Sarg.
168. Leaves broadest at the middle—169.
168. Leaves broadest towards the base—170.
169. Leaves broadly egg-shaped to round. Fruit less than $\frac{1}{2}$ inch thick. Stones $\frac{1}{4}$ of an inch long. Nova Scotia to Minn. and southward in the mountains. *Crataegus rotundifolia* Moench.
169. Leaves narrowly egg-shaped. Fruit more

than $\frac{1}{2}$ inch thick. Stones $\frac{3}{8}$ of an inch long. Southern Me. and up the Kennebec river. *Crataegus Jonesae* Sarg.

170. Mature leaves smooth above, or nearly so—
171.

170. Mature leaves hairy or woolly, or roughened,
above—173.

171. Leaves longer than broad—172.

171. Leaves about as long as broad. Western

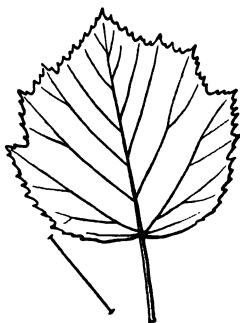


Fig. 212. *Crataegus Pringlei*.

New England to Penn. and Lake Michigan.
(Fig. 212.) *Crataegus Pringlei* Sarg.

172. Flower and fruit-stalks very hairy. North-
ern New England and N. Y. northward to
the St. Lawrence. *Crataegus anomala* Sarg.

172. Flower and fruit-stalks nearly smooth. New

England southward and westward. *Crataegus Holmesiana* Ashe.

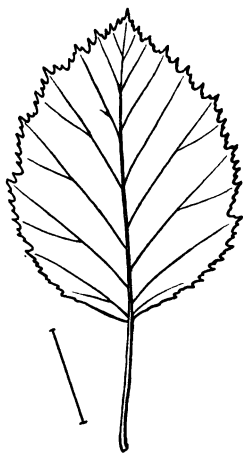


Fig. 213. *Crataegus Arnoldiana*.

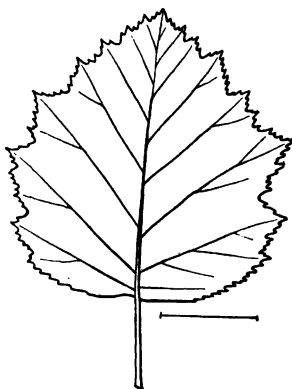


Fig. 214. *Crataegus submollis*.

173. Fruit pear-shaped or somewhat elongated, ripening in September and October—174.

173. Fruit globular, ripening in August. Local in southern New England. (Fig. 213.) *Crataegus Arnoldiana* Sarg.

174. Leaves thickish or somewhat leathery. Northwestern Vt. *Crataegus Champlainensis* Sarg.

174. Leaves thin. Southern Me. to central N. Y. and northward to the St. Lawrence. (Fig. 214.) *Crataegus submollis* Sarg.

CHERRY, PLUM, PEACH.—Leaves simple. Fruit fleshy or juicy, with a stony seed-like interior which encloses a single seed.

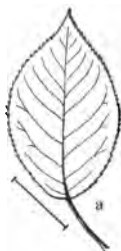


Fig. 215. Choke Cherry.
a. Leaf. b. Four teeth enlarged.



Fig. 216. Black Cherry.
a. Leaf. b. Two teeth enlarged.

175. Flower and fruit-stalks numerous, about $\frac{1}{4}$ of an inch long, arranged along the sides



Fig. 217. Black Cherry.

of a common much elongated axis. Fruit about $\frac{1}{4}$ of an inch thick—176.

116 KEY TO GENERA AND SPECIES

175. Flower and fruit-stalks apparently arising from a common point, or else from an axis hardly longer than the long individual flower and fruit-stalks—177.



Fig. 218. Peach.



Fig. 219. Peach.

176. Marginal teeth of the leaves very sharply pointed. Newfoundland southward and westward. (Fig. 215.) **Choke Cherry**, *Prunus virginiana* L.
176. Marginal teeth of the leaves blunt, incurved, or glandular. New Brunswick southward and westward. (Figs. 216, 217.) **Black Cherry**, **Wild Black Cherry**, **Rum Cherry**, *Prunus serotina* Ehrh.
177. Flower and fruit-stalks very short, $\frac{1}{4}$ of an

inch or less. Leaves narrow. Fruit velvety-hairy, $\frac{1}{2}$ inch or more thick; stone corrugated. Cult. (Figs. 218, 219.) **Peach**, *Prunus Persica* (L.) Stokes.

177. Flower and fruit-stalks conspicuous, or elon-



Fig. 220. Wild Red Cherry.
(Leaves variable.)



Fig. 221. Wild Plum.

gated. Fruit smooth, stone not corrugated
—178.

178. Teeth of the leaves sharply pointed. Fruit red, about $\frac{1}{4}$ of an inch thick. Labrador westward and southward to Penn. (Fig. 220.) **Wild Red Cherry, Pin Cherry, Pigeon Cherry, Bird Cherry, Fire Cherry**, *Prunus pennsylvanica* L. f.

178. Teeth of the leaves sharply pointed. Fruit reddish, $\frac{3}{4}$ to 1 inch thick. Conn. southward and westward. (Figs. 221, 222.)

Wild Plum, Yellow Plum, *Prunus americana*
Marsh.

178. Teeth of the leaves blunt or glandular-tipped
—179.

179. Margins of the calyx lobes finely glandular-



Fig. 222. Wild Plum.

toothed. Mature fruit smooth, orange-red or yellowish, about 1 inch long. Newfoundland to New England and westward. (Figs. 223, 224.) **Canada Plum, Red Plum, Horse Plum, Wild Plum, *Prunus nigra* Ait.**

179. Margins of the calyx lobes entire or nearly so—180.

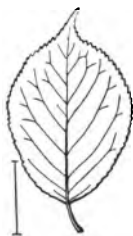


Fig. 223.
Canada Plum.



Fig. 224. Canada Plum.



Fig. 225.
Sweet Cherry.



Fig. 226. Sweet Cherry.

180. Flower-producing buds developing both flowers and leaves. Inner scales at the base of the flower-stalks longer than the outer, spreading. Fruit sweet. Cult. and escaped. (Figs. 225, 226.)

Sweet Cherry, *Prunus Avium* L.

180. Flower-producing buds developing only flowers. Inner scales at the base of the flower-stalks about like the outer, not spreading. Fruit acid, red. Cult. and escaped. (Fig. 227.)

Sour Cherry, *Prunus Cerasus* L.

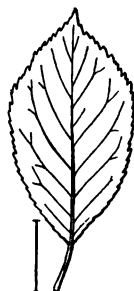


Fig. 227.
Sour Cherry.

LOCUST.—Leaves pinnately compound. Fruit flat, similar to a bean or pea pod, with 2 or more seeds.

181. Young twigs sticky. Va. southward, also cult. and escaped. (Fig. 228.) **Clammy Locust, Rose Acacia, *Robinia viscosa* Vent.**

181. Young twigs not sticky. Penn. and along the mountains to Ga., also cult. and escaped. (Figs. 229, 230.) **Common Locust, Black Locust, Yellow Locust, White Locust, *Robinia Pseudo-Acacia* L.**

SUMACH.—Leaves alternate, pinnately compound (except in the Smoke Tree). Juice sticky as it dries, commonly milky-white when fresh. Fruit globular, less than $\frac{1}{4}$ of an

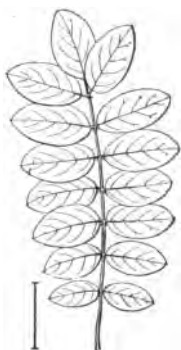


Fig. 228. Clammy Locust.

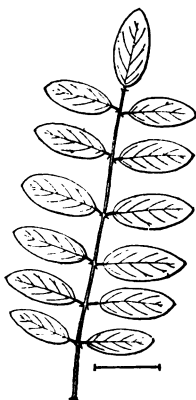


Fig. 229. Common Locust.

inch thick. Usually shrubs, the following occasionally small trees.

182. Leaves simple. Cult. Native in Eurasia.
(Fig. 231.) **Smoke Tree, Venetian Sumach,**
Rhus Cotinus L.

182. Leaves compound—**183.**

183. Leaflets toothed—**184.**

183. Leaflets not toothed—**185.**

184. Young twigs velvety-hairy. Fruit red. Throughout our range. (Fig. 232. Leaf outline essentially the same as in Fig. 234.)

Staghorn Sumach, *Rhus typhina* L.

184. Young twigs not hairy. Fruit red. Central Me. southward and westward. (Fig. 234.)

Smooth Sumach, *Rhus glabra* L.

185. Leaf axis between the leaflets prominently winged. Fruit red. Usually a shrub.



Fig. 230. Common Locust.



Fig. 231. Smoke Tree.

Southern Me. southward and westward. (Fig. 233.) **Dwarf Sumach, *Rhus copallina* L.**

185. Leaf axis between the leaflets not winged. Fruit whitish or grayish. Very poisonous. Usually growing in swamps. Southwestern Me. southward and westward. (Fig. 235.)
Poison Sumach, Poison Elder, Poison Dog-

wood, Dogwood, Swamp Sumach, Poison Ash, *Rhus Vernix* L.

NOTE.—Many persons are poisoned by merely handling the Poison Sumach. The poisonous principle is of an oily nature and is found in every part of the plant. A good



Fig. 232. Staghorn Sumach.



Fig. 233. Dwarf Sumach.

preventive against severe poisoning is to wash the parts of the body that have come in contact with the plant with strong alcohol (or strong soap suds) immediately after such contact; the sooner this is done the more effective will be the remedy. The **Poison Ivy** or **Poison Oak** (*Rhus Toxicodendron* L.) climbs by means of numerous dark brown roots, or trails over the ground



Fig. 234. Smooth Sumach.



Fig. 235. Poison Sumach.



Fig. 236. Norway Maple.

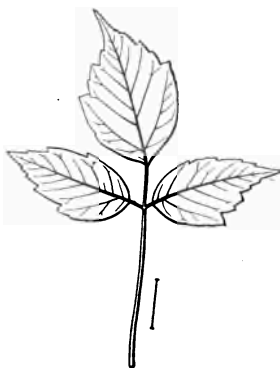


Fig. 237. Box Elder.

and fences, never becoming a tree. It is a near relative of the Poison Sumach and like that plant poisons many persons who handle it. It may be recognized by its compound leaves of three leaflets, the ter-



Fig. 238. Norway Maple.

minal one stalked, the margins with a few large teeth or none, and the milky juice. Flowers, fruits, poisonous properties, and remedies as in the Poison Sumach. Few persons are ever poisoned, even slightly, by handling any other than these two plants.

MAPLE.—Leaves opposite, palmately veined when simple. Fruit with a long unsymmetrical flat wing.

186. Leaves simple—187.

186. Leaves compound. Western New England southward and westward, also cult. and escaped. (Fig. 237.) **Box Elder, Ash-leaved Maple, *Acer Negundo* L.**

187. Juice milky. Cult. Native in Eurasia. (Figs. 236, 238.) **Norway Maple, *Acer platanoides* L.**

187. Juice not milky—188.

188. Flower (or fruit) stalks arranged along a common much elongated axis—189.

188. Flower (or fruit) stalks apparently arising from a common point—191.

189. Flower (or fruit) clusters erect or nodding, but not pendulous. Newfoundland to northern New England and westward; southward in the mountains. (Fig. 239.) **Mountain Maple, *Acer spicatum* Lam.**



Fig. 239. Mountain Maple. (Leaves often longer.)

189. Flower (or fruit) clusters drooping or pendulous—190.

190. Bark of small branches light green, striped with either whitish or dark lines. Leaves smooth, usually with 3 shallow taper-pointed lobes. New Brunswick westward

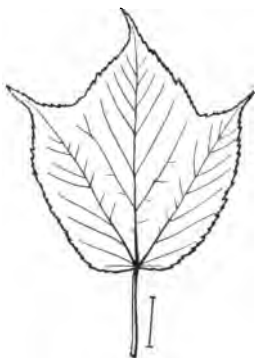


Fig. 240. Striped Maple.



Fig. 241. Striped Maple.

and southward in the mountains. (Figs. 240, 241.) **Striped Maple, Moosewood, Striped Dogwood, *Acer pennsylvanicum* L.**

190. Bark of small branches not striped. Leaves usually 5-lobed and downy-hairy beneath. Cult. and escaped. Native in Eurasia. (Figs. 242, 244.) **Sycamore Maple, European Sycamore, *Acer Pseudo-Platanus* L.**

191. Flowers in rather close clusters, not drooping, appearing before the leaves in early spring—
192.

128 KEY TO GENERA AND SPECIES

191. Flowers in drooping clusters on long slender hairy stalks—194.



Fig. 242. Sycamore Maple.



Fig. 243. White Maple.

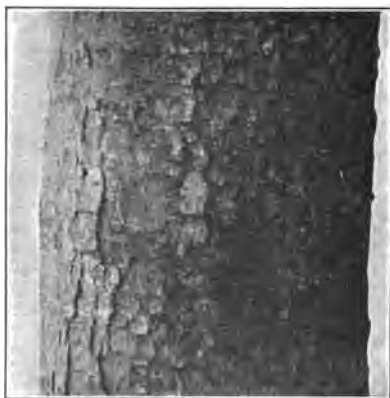


Fig. 244. Sycamore Maple.

192. Leaves deeply 5-lobed. Petals none. Nearly throughout our range. (Figs. 243, 245.)
White Maple, Silver Maple, Soft Maple,
Acer saccharinum L.

- 192.** Leaves not cut half way to the base. Petals present—**193.**

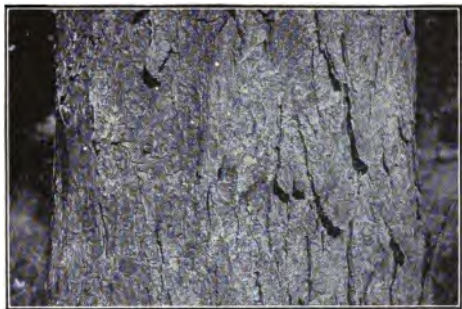


Fig. 245. White Maple.

- 193.** Leaves 3 to 6 inches long, middle lobe oblong at base. Bark and leaves quite variable.

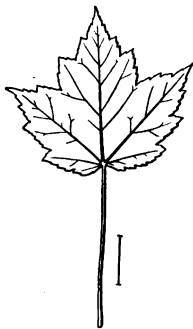


Fig. 246. Red Maple.



Fig. 247. Red Maple.

Nearly throughout our range. (Figs. 246, 247.) **Red Maple, Swamp Maple, Soft Maple, *Acer rubrum* L.**

193. Leaves 2 to 4 inches long, middle lobe broadly triangular. Merely a form of the Red Maple. New Brunswick and Mass., and local southward and westward. (Fig. 248.) **Three-Toothed Red Maple**, *Acer rubrum* var. *tridens* Wood.



Fig. 248. Three-toothed Red Maple.

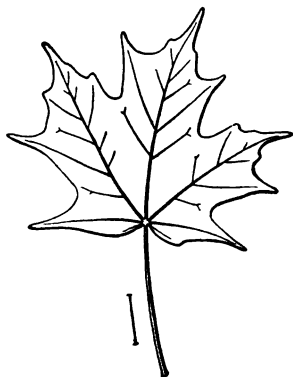


Fig. 249. Rock Maple. From infertile branch.

194. Lower surface of the leaf pale and smoothish. Leaves of infertile trees (Fig. 249) differ from those of the fertile or fruiting trees. (Fig. 251.) Throughout our range. (Figs. 249, 251, 250.) **Rock Maple, Sugar Maple, Hard Maple, Sugar-tree**, *Acer saccharum* Marsh.



Fig. 250. Rock Maple.

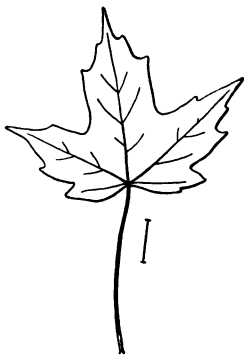


Fig. 251. Rock Maple.
From fruiting branch.

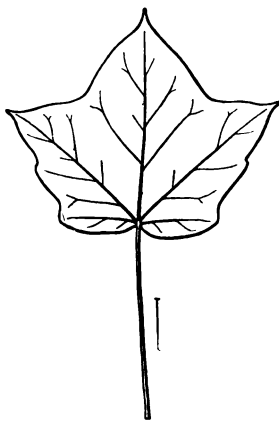


Fig. 252. Black Rock Maple.

194. Lower surface of the leaf green and hairy. A form of the Rock Maple. Western New England southward and westward. (Fig. 252.) **Black Rock Maple**, *Acer saccharum* var. *nigrum* (Michx. f.) Britton.



Fig. 253. Horse-Chestnut.

HORSE-CHESTNUT, BUCKEYE. — Leaves opposite, palmately compound. Several species of Buckeye from farther west are occasionally planted; these all differ from the common Horse-chestnut in having 4 petals instead of 5.

195. Fruit prickly—196.

195. Fruit smooth. Petals 4—197.

196. Petals 5, white, spreading. Leaflets usually 7.
Cult. Native of southeastern Europe and
Asia. (Figs. 253, 254.) **Horse-chestnut,**
Common Horse-chestnut, *Aesculus Hippo-*
***castanum* L.**



Fig. 254. Horse-Chestnut.

196. Petals 4, yellow, erect. Leaflets usually 5.
Margins toothed, with tufts of hairs in the
notches. Central Penn. southward and
southwestward, also cult. (Fig. 255.)
Fetid Buckeye, Ohio Buckeye, *Aesculus*
***glabra* Willd.**

197. Petals yellow. Western Penn. southward and

Leaf-stalk. The well-marked slender support of a leaf-blade, as the short stem-like portion at the base of Fig. 121. The leaf-stalk is sometimes absent.

Lobed. With marginal indentations running $\frac{1}{3}$ to $\frac{2}{3}$ of the distance to the center or base, the segments usually somewhat rounded, as in Figs. 30, 169.

Longitudinal. Lengthwise, from base to apex.

Midrib. The central vein of a leaf, especially when more prominent than the other veins.

Milky. With an opaque, usually white, juice.

Needle-shaped. Long and slender, neither definitely flattened nor regularly tapering; may be long as in the Pine (Fig. 63), or short as in the Spruce (Fig. 80).

Node. The point on, or line around, a stem from which one or more leaves arise. Often not specially marked otherwise than that a leaf or leaf-scar is found there.

Notch. An angular indentation, as along the margins in Fig. 95.

Nut. A hard or bony fruit, like that of the walnut, oak, chestnut.

Nutlet. A small nut, or a small, hard, seed-like part of a fruit.

Oblong. Two or three times longer than broad, with the sides nearly parallel.

Once compound (leaf). With the leaflets attached to the primary axis of the leaf, as in Figs. 54a, 253.

Opposite (leaves). With two leaves at the same node, as in Fig. 2a.

Palmate, Palmately compound. With several leaflets

- starting from a common point at the tip of the leaf-stalk, as in Fig. 253.
- Papery** (bark). Splitting into thin papery films, as in Fig. 132.
- Petal**. One of the parts of a flower, situated between the stamens and the calyx. The petals are usually the most conspicuous parts of the ordinary flower, generally being brightly colored, or white.
- Pinnate, Pinnately compound**. With several leaflets starting from different points along two sides of a common leaf-axis, as in Fig. 54a.
- Pinnately veined**. With numerous side veins branching somewhat regularly from both sides of a midrib, as in Fig. 178.
- Pistil**. The central organ, or one of the central organs, of a flower, in which the ovules (immature seeds) are produced.
- Pith**. The much softer central portion of a branch or branchlet.
- Pod**. A dry fruit which splits open naturally at maturity.
- Pointed**. With a definite point (blunt or acute), as in Figs. 21, 133.
- Prickly**. With small sharp-pointed hairs or spines.
- Recurved**. Curving backward or downward.
- Rhombic**. Of the general shape of a rhomb, as in Fig. 123.
- Rounded** (apex or base). Regularly curving, without notch or point, as the tips of the lobes and the apex of the leaf in Fig. 173.
- Scale**. A degenerate leaf. In a cone one of the somewhat flattened, usually woody, structures attached to the main axis.

Scale-like (leaf). A small and short leaf, the apex of which usually overlaps the base of the one next above it, like the scale of a fish, as in Fig. 5.

Scaly (bark). With flattish raised areas, especially when the edges are somewhat separated from the bark beneath, as in Fig. 170.

Shield-shaped. A somewhat circular or angular structure with its supporting stalk attached to one of the flat surfaces instead of to the edge.

Shoot. A stem and its leaves collectively considered.

Shreddy. With the edges of the scales or plates appearing as if frayed into shreds, as in Fig. 50.

Side veins. Veins branching from a midrib.

Simple (leaf). With only one blade, as in Figs. 47, 49, 173, 186.

Smooth. Neither rough nor hairy.

Spine. A sharp and slender stiff point.

Spiny. Having spines.

Stamens. The slender, usually stalked, structures surrounding the pistil of a flower. The box-like portion at the top is the anther in which the pollen is produced.

Stipules. Two small leaf-like bodies at the base of a leaf-stalk, as in Fig. 86. Commonly absent.

Symmetrical. Even-sided; one side essentially like the other, as in Fig. 146.

Taper-pointed. With a somewhat elongated point, especially when the margins below it are concave, as the apex of Fig. 84.

Teeth. Small projections along the margin, as in Fig. 100.

Terminal bud. A bud situated at the end of a stem or branch.

Thorn. A stiff woody sharp-pointed structure.

- Toothed.** Having small projections along the margin like the teeth of a saw, as in Fig. 100.
- Top-shaped.** A somewhat globular structure which tapers regularly to a narrow base, like an inverted geometrical cone.
- Triangular.** Of the general shape of a triangle, as in Fig. 127.
- Trunk.** The main stem of a tree, usually restricted to mean the part below the crown.
- Twice compound.** With leaflets attached to the secondary axes of the leaf (i. e., the main axis divides before it bears leaflets), as in Fig. 54*b*.
- Twig.** A young shoot. Sometimes used with reference to the branchlet without the leaves.
- Unsymmetrical.** With the two sides unlike, as in Fig. 262.
- Vein.** One of the ribs or thickened lines in a leaf-blade.
- Wavy.** Alternately concave and convex along the margin, as in Fig. 46.
- Wedge-shaped (leaf).** Tapering regularly from a broad apex to a pointed base. A wedge-shaped base is pointed (often bluntly), with the margins straight or nearly so, like the sides of a wedge, as in Fig. 153.
- Whorled.** With three or more leaves around the stem at the same node, as in Fig. 1.
- Wing.** Any thin flat appendage attached to a thicker main structure.
- Woolly.** Covered with tangled or loosely matted hairs.



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A SYSTEMATIC LIST OF TREES GROUPED IN FAMILIES, WITH PAGE REFERENCES

Native American trees in **bold face**. Foreign trees in roman.
Scientific names in *italics*.

YEW FAMILY	TAXACEAE	PAGE
1. Maiden-hair Tree, Ginkgo	<i>Ginkgo biloba</i> L.	11
PINE FAMILY	PINACEAE	
2. White Pine	<i>Pinus Strobus</i> L.	40
3. Loblolly Pine	<i>Pinus Taeda</i> L.	41, 42
4. Pitch Pine	<i>Pinus rigida</i> Mill.	41
5. Table Mountain Pine	<i>Pinus pungens</i> Lamb.	43
6. Jersey Pine	<i>Pinus virginiana</i> Mill.	43
7. Northern Scrub Pine	<i>Pinus Banksiana</i> Lamb.	43
8. Red Pine	<i>Pinus resinosa</i> Ait.	44
9. Austrian Pine	<i>Pinus Laricio</i> v. <i>austriaca</i> Endl.	45
10. Scotch Pine	<i>Pinus sylvestris</i> L.	44
11. Yellow Pine	<i>Pinus echinata</i> Mill.	40, 42
12. American Larch	<i>Larix laricina</i> (Du Roi) Koch.	45
13. European Larch	<i>Larix decidua</i> Mill.	46
14. Douglas Spruce	<i>Pseudotsuga taxifolia</i> Britt.	10
15. Colorado Blue Spruce	<i>Picea Menziesii</i> Engelm.	48
16. White Spruce	<i>Picea canadensis</i> (Mill.) BSP	49
17. Red Spruce	<i>Picea rubra</i> (Du Roi) Dietr.	47
18. Black Spruce	<i>Picea mariana</i> (Mill.) BSP	47
19. Norway Spruce	<i>Picea Abies</i> (L.) Karst	46, 48

		PAGE
20. Oriental Spruce	<i>Picea orientalis</i> Carr.	48
21. Balsam Fir	<i>Abies balsamea</i> (L.) Mill.	9
22. Hemlock	<i>Tsuga canadensis</i> (L.) Carr.	7
23. Bald Cypress	<i>Taxodium distichum</i> (L.) Richard	9
24. Coast White Cedar	<i>Chamaecyparis thyoides</i> (L.) BSP.	6
25. Arbor Vitae	<i>Thuja occidentalis</i> L.	5
26. Common Juniper	<i>Juniperus communis</i> L.	2, 6
27. Dwarf Juniper	<i>Juniperus communis</i> v. <i>depressa</i> Pursh.	2, 6
28. Red Cedar	<i>Juniperus virginiana</i> L.	4, 5

WILLOW FAMILY

SALICACEAE

29. Black Willow	<i>Salix nigra</i> Marsh.	51
30. Ward's Willow	<i>Salix Wardi</i> Bebb.	51
31. Peach-leaved Willow	<i>Salix amygdaloides</i> Anders.	50
32. Bay-leaved Willow	<i>Salix pentandra</i> L.	50
33. Crack Willow	<i>Salix fragilis</i> L.	52
34. White Willow	<i>Salix alba</i> L.	53
35. Yellow Willow	<i>Salix alba</i> v. <i>vitellina</i> (L.) Koch.	53
36. Blue Willow	<i>Salix alba</i> v. <i>caerulea</i> (Sm.) Koch.	53
37. Weeping Willow	<i>Salix babylonica</i> L.	52
38. White Poplar	<i>Populus alba</i> L.	53
39. American Aspen	<i>Populus tremuloides</i> Michx.	55
40. Large-toothed Aspen	<i>Populus grandidentata</i> Michx.	54
41. Downy Poplar	<i>Populus heterophylla</i> L.	58
42. Balsam Poplar	<i>Populus balsamifera</i> L.	57
43. Balm of Gilead	<i>Populus candicans</i> Ait.	58
44. Carolina Poplar	<i>Populus deltoides</i> Marsh.	56
45. Black Poplar	<i>Populus nigra</i> L.	57
46. Lombardy Poplar	<i>Populus nigra</i> v. <i>italica</i> Du Roi	56

SYSTEMATIC LIST OF TREES

163

WALNUT FAMILY

JUGLANDACEAE

		PAGE
47. Butternut	<i>Juglans cinerea</i> L.	60
48. Black Walnut	<i>Juglans nigra</i> L.	60
49. Shag-bark Hickory	<i>Carya ovala</i> (Mill.) K. Koch.	62
50. Big Shell-bark	<i>Carya laciniosa</i> (Michx. f.) Loud.	68
51. Mockernut	<i>Carya alba</i> (L.) K. Koch.	67
52. Small-fruited Hickory	<i>Carya microcarpa</i> Nutt.	65
53. Pignut	<i>Carya glabra</i> (Mill.) Spach.	65
54. Bitternut	<i>Carya cordiformis</i> (Wang.) K. Koch.	67

BIRCH FAMILY

BETULACEAE

55. Hop Hornbeam	<i>Ostrya virginiana</i> (Mill.) K. Koch.	28
56. American Hornbeam	<i>Carpinus caroliniana</i> Walt.	29
57. Black Birch	<i>Betula lenta</i> L.	69
58. Yellow Birch	<i>Betula lutea</i> Michx. f.	71
59. River Birch, Red Birch	<i>Betula nigra</i> L.	73
60. Gray Birch	<i>Betula populifolia</i> Marsh.	73
61. White Birch, Blue Birch	<i>Betula pendula</i> Roth.	74
62. Cut-leaved Birch	<i>Betula pendula</i> v. <i>dalecarlica</i> L.	73
63. European Paper Birch	<i>Betula alba</i> L.	75
64. Weeping Birch	<i>Betula alba</i> v. <i>pendula</i> Hort.	74
65. American Canoe Birch	<i>Betula alba</i> v. <i>papyrifera</i> (Marsh) Spach.	76
66. Cordate-leaved Birch	<i>Betula alba</i> v. <i>cordifolia</i> (Regel) Fernald	75
67. Downy Green Alder	<i>Alnus mollis</i> Fernald	76
68. Speckled Alder	<i>Alnus incana</i> (L.) Muench	77
69. Smooth Alder	<i>Alnus rugosa</i> (Du Roi) Spreng.	78
70. European Black Alder	<i>Alnus vulgaris</i> Hill	78

		PAGE
71. Sea-side Alder	<i>Alnus maritima</i> (Marsh.) Muhl.	77

BEECH FAMILY

FAGACEAE

72. American Beech	<i>Fagus grandifolia</i> Ehrh.	80
73. European Beech	<i>Fagus sylvatica</i> L.	80
74. Purple-leaved Beech	<i>Fagus sylvatica</i> v. <i>purpurea</i> Ait.	79
75. Fern-leaved Beech	<i>Fagus sylvatica</i> v. <i>heterophylla</i> Loud.	79
76. American Chestnut	<i>Castanea dentata</i> (Marsh.) Borkh.	81
77. European Chestnut	<i>Castanea sativa</i> Mill.	82
78. Chinquapin	<i>Castanea pumila</i> (L.) Mill.	81
79. White Oak	<i>Quercus alba</i> L.	91
80. English Oak	<i>Quercus Robur</i> L.	89
81. Post Oak	<i>Quercus stellata</i> Wang.	94
82. Over-cup Oak	<i>Quercus lyrata</i> Walt.	90
83. Bur Oak, Mossy-cup Oak	<i>Quercus macrocarpa</i> Michx.	94
84. Swamp White Oak	<i>Quercus bicolor</i> Willd.	91
85. Cow Oak	<i>Quercus Michauxii</i> Nutt.	89
86. Yellow Oak	<i>Quercus Muhlenbergii</i> Engelm.	92
87. Chestnut Oak	<i>Quercus Prinus</i> L.	89, 92
88. Red Oak	<i>Quercus rubra</i> L.	86
89. Gray Oak	<i>Quercus rubra</i> v. <i>ambigua</i> (Michx. f.) Fernald	86
90. Pin Oak	<i>Quercus palustris</i> Muench.	86
91. Scarlet Oak	<i>Quercus coccinea</i> Muench.	85
92. Black Oak	<i>Quercus velutina</i> Lam.	85
93. Spanish Oak	<i>Quercus falcata</i> Michx.	87
94. Scrub Oak	<i>Quercus ilicifolia</i> Wang.	87
95. Water Oak	<i>Quercus nigra</i> L.	83
96. Black Jack Oak	<i>Quercus marilandica</i> Muench.	88, 93
97. Laurel Oak	<i>Quercus imbricaria</i> Michx.	83

SYSTEMATIC LIST OF TREES 165

		PAGE
98. Willow Oak	<i>Quercus phellos</i> L.	83
NETTLE FAMILY	URTICACEAE	
99. Slippery Elm	<i>Ulmus fulva</i> Michx.	97
100. English Elm	<i>Ulmus campestris</i> L.	99
101. Wych Elm, Scotch Elm	<i>Ulmus montana</i> With.	99
102. American Elm	<i>Ulmus americana</i> L.	96
103. Cork Elm, Rock Elm	<i>Ulmus racemosa</i> Thomas	97
104. Hackberry	<i>Celtis occidentalis</i> L.	16
105. Osage Orange	<i>Maclura pomifera</i> (Raf.) Schneider	19
106. Paper Mulberry	<i>Broussonetia papyrifera</i> (L.) Vent.	16
107. Red Mulberry	<i>Morus rubra</i> L.	100
108. White Mulberry	<i>Morus alba</i> L.	100
MAGNOLIA FAMILY	MAGNOLIACEAE	
109. Sweet Bay	<i>Magnolia virginiana</i> L.	102
110. Cucumber Tree	<i>Magnolia acuminata</i> L.	103
111. Great-leaved Magnolia	<i>Magnolia macrophylla</i> Michx.	103
112. Umbrella Tree	<i>Magnolia tripetala</i> L.	102
113. Tulip Tree	<i>Liriodendron Tulipifera</i> L.	23, 32
CUSTARD APPLE FAMILY	ANONACEAE	
114. Papaw	<i>Asimina triloba</i> Dunal.	18
LAUREL FAMILY	LAURACEAE	
115. Sassafras	<i>Sassafras variifolium</i> (Salish.) Ktze	17, 32
WITCH HAZEL FAMILY	HAMAMELIDACEAE	
116. Witch Hazel	<i>Hamamelis virginiana</i> L.	24
117. Sweet Gum	<i>Liquidambar Styraciflua</i> L.	13

166 SYSTEMATIC LIST OF TREES

PLANE-TREE FAMILY		PLATANACEAE	PAGE
118. Buttonwood	<i>Platanus occidentalis</i> L.		14
ROSE FAMILY		ROSACEAE	
119. Pear	<i>Pyrus communis</i> L.		105
120. Siberian Crab	<i>Pyrus baccata</i> L.		105
121. Narrowleaf Crab	<i>Pyrus angustifolia</i> Ait.		106
122. American Crab	<i>Pyrus coronaria</i> L.		105
123. Apple	<i>Pyrus Malus</i> L.		104
124. Quince	<i>Pyrus Cydonia</i> L.		104
125. American Mountain Ash	<i>Pyrus americana</i> (Marsh.) DC.		107
126. Western Mountain Ash	<i>Pyrus sitchensis</i> (Roem.) Piper.		108
127. European Mountain Ash	<i>Pyrus Aucuparia</i> (L.) Ehrh.		108
128. Shad Bush	<i>Amelanchier canadensis</i> (L.) Medic.		109
129. Dwarf Juneberry	<i>Amelanchier oblongifolia</i> (T. & G.) Roem.		109
130. English Hawthorn	<i>Crataegus monogyna</i> Jacq.		109
131. Cock-spur Thorn	<i>Crataegus Crus-galli</i> L.		111
132. Scarlet Thorn	<i>Crataegus coccinea</i> L.		110
133. Thorn	<i>Crataegus Oakesiana</i> Eg- gleston		111
134. Thorn	<i>Crataegus rotundifolia</i> Moench.		112
135. Thorn	<i>Crataegus Jonesae</i> Sarg.		113
136. Thorn	<i>Crataegus macrosperma</i> Ashe.		112
137. Thorn	<i>Crataegus pruinosa</i> (Wendl.) C. Koch.		112
138. Thorn	<i>Crataegus Holmesiana</i> Ashe.		114
139. Thorn	<i>Crataegus anomala</i> Sarg.		113
140. Thorn	<i>Crataegus coccinioides</i> v. <i>di-</i> <i>latata</i> (Sarg.) Eggleston		112
141. Thorn	<i>Crataegus Pringlei</i> Sarg.		113

SYSTEMATIC LIST OF TREES 167

		PAGE
142. Thorn	<i>Crataegus pedicillata</i> Sarg.	112
143. Thorn	<i>Crataegus Arnoldiana</i> Ashe.	114
144. Thorn	<i>Crataegus submollis</i> Sarg.	114
145. Thorn	<i>Crataegus Champlainensis</i> Sarg.	114
146. Thorn	<i>Crataegus macracantha</i> Lodd.	110
147. Black Cherry	<i>Prunus scrotina</i> Ehrh.	116
148. Choke Cherry	<i>Prunus virginiana</i> L.	116
149. Wild Red Cherry	<i>Prunus pennsylvanica</i> L. f.	117
150. Sweet Cherry	<i>Prunus Avium</i> L.	120
151. Sour Cherry	<i>Prunus Cerasus</i> L.	120
152. Canada Plum	<i>Prunus nigra</i> Ait.	118
153. Wild Plum	<i>Prunus americana</i> Marsh.	118
154. Peach	<i>Prunus Persica</i> (L.) Stokes	117

PULSE FAMILY

LEGUMINOSAE

155. Kentucky Coffee Tree	<i>Gymnocladus dioica</i> (L.) Koch.	35, 36
156. Honey Locust	<i>Gleditsia triacanthos</i> L.	35
157. Redbud	<i>Cercis canadensis</i> L.	14
158. Yellow Wood	<i>Cladrastis lutea</i> (Michx. f.) Koch.	38
159. Common Locust	<i>Robina Pseudo-Acacia</i> L.	120
160. Clammy Locust	<i>Robinia viscosa</i> Vent.	120

QUASSIA FAMILY

SIMARUBACEAE

161. Tree of Heaven	<i>Ailanthus glandulosa</i> (Desf.)	35, 37
---------------------	-------------------------------------	--------

CASHEW FAMILY

ANACARDIACEAE

162. Staghorn Sumach	<i>Rhus typhina</i> L.	122
163. Smooth Sumach	<i>Rhus glabra</i> L.	122
164. Dwarf Sumach	<i>Rhus copallina</i> L.	122

168 SYSTEMATIC LIST OF TREES

		PAGE
165. Poison Sumach	<i>Rhus Vernix</i> L.	122
166. Smoke Tree	<i>Rhus Colinus</i> L.	121

HOLLY FAMILY

AQUIFOLIACEAE

167. Holly	<i>Ilex opaca</i> Ait.	25
------------	------------------------	----

MAPLE FAMILY

ACERACEAE

168. Striped Maple	<i>Acer pennsylvanicum</i> L.	127
169. Mountain Maple	<i>Acer spicatum</i> Lam.	126
170. Rock Maple, Sugar Maple	<i>Acer saccharum</i> Marsh.	130
171. Black Rock Maple	<i>Acer saccharum</i> v. <i>nigrum</i> (Michx. f.) Britton	132
172. White Maple	<i>Acer saccharinum</i> L.	128
173. Red Maple	<i>Acer rubrum</i> L.	129
174. Three-toothed Red Maple	<i>Acer rubrum</i> v. <i>tridens</i> Wood.	130
175. Norway Maple	<i>Acer platanoides</i> L.	126
176. Sycamore Maple	<i>Acer Pseudo-Platanus</i> L.	127
177. Box Elder	<i>Acer Negundo</i> L.	126

SOAPBERRY FAMILY

SAPINDACEAE

178. Horse-chestnut	<i>Aesculus Hippocastanum</i> L.	133
179. Fetid Buckeye	<i>Aesculus glabra</i> Willd.	133
180. Sweet Buckeye	<i>Aesculus octandra</i> Marsh.	134
181. Purple Buckeye	<i>Aesculus octandra</i> v. <i>hybrida</i> (DC.) Sarg.	134
182. Red Buckeye	<i>Aesculus Pavia</i> L.	134

BUCKTHORN FAMILY

RHAMNACEAE

183. Buckthorn	<i>Rhamnus cathartica</i> L.	26
----------------	------------------------------	----

SYSTEMATIC LIST OF TREES 169

LINDEN FAMILY

- 184. American Basswood
- 185. European Linden
- 186. Silver Linden
- 187. Southern Basswood
- 188. White Basswood

TILIACEAE

PAGE

- Tilia americana* L. 136
- Tilia vulgaris* Hayne 135
- Tilia tomentosa* Muench. 135
- Tilia Michauxii* Nutt. 136
- Tilia heterophylla* Vent. 136

DOGWOOD FAMILY

- 189. Flowering Dogwood
- 190. Alternate-leaved Dog-
wood
- 191. Black Gum

CORNACEAE

- Cornus florida* L. 139
- Cornus alternifolia* L. f. 139
- Nyssa sylvatica* Marsh. 22

HEATH FAMILY

- 192. Rhododendron
- 193. Mountain Laurel
- 194. Sourwood

ERICACEAE

- Rhododendron maximum* L. 19
- Kalmia latifolia* L. 19
- Oxydendron arboreum* (L.)
DC. 31

EBONY FAMILY

- 195. Persimmon

EBENACEAE

- Diospyros virginiana* L. 21

OLIVE FAMILY

- 196. White Ash
- 197. Biltmore Ash
- 198. Red Ash
- 199. Green Ash
- 200. Pumpkin Ash
- 201. Blue Ash

OLEACEAE

- Fraxinus americana* L. 144
- Fraxinus Biltmoreana* Bea-
dle 141
- Fraxinus pennsylvanica*
Marsh. 141
- Fraxinus pennsylvanica* v.
lanceolata (Borkh) Sarg. 144
- Fraxinus profunda* Bush. 142
- Fraxinus quadrangulata*
Michx. 144

		PAGE
202. Black Ash	<i>Fraxinus nigra</i> Marsh.	140
203. European Ash	<i>Fraxinus excelsior</i> L.	140
204. Lilac	<i>Syringa vulgaris</i> L.	20
205. Fringe Tree	<i>Chionanthus virginica</i> L.	20

FIGWORT FAMILY

SCROPHULARIACEAE

206. Paulownia	<i>Paulownia tomentosa</i> (Thunb.) Steud.	13
----------------	---	----

BIGONIA FAMILY

BIGONIACEAE

207. Hardy Catalpa	<i>Catalpa speciosa</i> Warder	145
208. Common Catalpa	<i>Catalpa bignonioides</i> Walt.	147

MADDER FAMILY

RUBIACEAE

209. Buttonbush	<i>Cephalanthus occidentalis</i> L.	20
-----------------	-------------------------------------	----

HONEYSUCKLE FAMILY

CAPRIFOLIACEAE

210. Sweet Viburnum	<i>Viburnum Lentago</i> L.	147
211. Black Haw	<i>Viburnum prunifolium</i> L.	147

INDEX TO TREE NAMES

- Abele, 53
- Abies balsamea, 9
- Acacia, Rose, 120
 - Three-thorned, 35
- Acer Negundo, 126
 - pennsylvanicum, 127
 - platanoides, 126
 - Pseudo-Platanus, 127
 - rubrum, 129
 - rubrum var. tridens, 130
 - saccharinum, 128
 - saccharum, 130
 - saccharum var. nigrum, 132
 - spicatum, 126
- Aesculus glabra, 133
 - Hippocastanum, 133
 - octandra, 134
 - octandra var. hybrida, 134
 - Pavia, 134
- Ailanthus, 35, 37
 - glandulosa, 35, 37
- Alder, 30, 76
 - Downy Green, 76
 - European Black, 78
 - Hoary, 77
 - Seaside, 77
 - Smooth, 78
 - Speckled, 77
- Alligator-wood, 13
- Almondleaf Willow, 50
- Alnus incana, 77
 - maritima, 77
- Alnus mollis, 76
 - rugosa, 78
 - vulgaris, 78
- Alternate-leaved Cornel, 139
- Amelanchier canadensis, 109
 - canadensis var. tomentula, 108
 - oblongifolia, 109
- American Aspen, 53, 55
 - Basswood, 136
 - Beech, 80
 - Canoe Birch, 86
 - Chestnut, 81
 - Crab, 105
 - Elm, 96
 - Holly, 25
 - Hornbeam, 29
 - Larch, 45
 - Linden, 136
 - Mountain Ash, 107
 - Sycamore, 14
- Apple, 26, 31, 107
 - Custard, 18
 - Southern Crab, 106
- Arbor Vitae, 5
- Arrow-wood, 26, 147
- Ash, 37, 139
 - Speckled, 140
 - Basket, 140
 - Bastard, 141
 - Biltmore, 141
 - Black, 140
 - Blue, 144

- Ash, Brown, 140, 141
 European, 140
 Green, 144
 Hoop, 140
 Mountain, 38
 Poison, 123
 Pumpkin, 142
 Red, 141
 River, 141
 Swamp, 140
 White, 144
 Ash-leaved Maple, 37, 126
 Asimina triloba, 18
 Asp, Quaking, 55
 Aspen, American, 53, 55
 Large-toothed, 54
 Austrian Pine, 45

 Bald Cypress, 9
 Balm of Gilead, 57, 58
 Fir, 9
 Balsam, 9, 58
 Fir, 9
 Poplar, 31, 57
 Willow, 49
 Barren Oak, 87
 Basket Ash, 140
 Oak, 89
 Basswood, 134, 136
 American, 136
 Southern, 136
 White, 136
 Bastard Ash, 141
 Bay, Rose, 19
 Sweet, 102
 Bay-leaved Willow, 50

 Bean, Indian, 145, 147
 Smoking, 147
 Bean Tree, 147
 Bear Oak, 87
 Beech, 25, 27, 79, 80
 American, 80
 Blue, 29
 European, 80
 Fern-leaved, 32, 79
 Purple-leaved, 79
 Red, 80
 Water, 29
 Weeping, 80
 White, 80
 Beetree, 136
 Betula alba, 75
 alba var. cordifolia, 75
 alba var. glutinosa, 74
 alba var. papyrifera, 76
 alba var. pendula, 74
 lenta, 69
 lutea, 71
 nigra, 73
 pendula, 74
 pendula var. dalecarlica, 73
 populifolia, 73
 Big Shell-bark, 68
 Biltmore Ash, 141
 Birch, 28, 30, 68
 American Canoe, 76
 Black, 69
 Blue, 74
 Canoe, 76
 Cherry, 69
 Cordate-leaved, 75
 Cut-leaved, 32, 73

- Birch, European Paper, 75
 Gray, 73
 Old-field, 73
 Paper, 76
 Poverty, 73
 Red, 73
 River, 73
 Silver, 71
 Sweet, 69
 Weeping, 74
 White, 73, 74, 76
 Yellow, 71
Bird Cherry, 117
Bitternut, 67
Black Ash, 140
 Birch, 69
 Cherry, 116
 Gum, 22
 Haw, 147
 Jack Oak, 88, 93
 Locust, 120
 Mulberry, 100
 Oak, 85
 Poplar, 57
 Rock Maple, 132
 Spruce, 47
 Walnut, 60
 Willow, 51
Blue Ash, 144
 Beech, 29
 Birch, 74
 Dogwood, 139
 Willow, 53
Bog Spruce, 47
Box Elder, 37, 126
 White Oak, 94
Boxwood, 139
Broussonetia papyrifera, 16
Brown Ash, 140, 141
 Hickory, 65
Buckeye, 33, 132
 Fetid, 133
 Ohio, 133
 Purple, 134
 Red, 134
 Sweet, 134
 Yellow, 134
Buckthorn, 26
Bullnut, 67
Bur Oak, 94
Butternut, 60
Buttonball-tree, 14
Buttonbush, 20
Buttonwood, 14

Calico Bush, 19
Canada Plum, 118
Canoe Birch, 76
Carolina Poplar, 56
Carpinus caroliniana, 29
Carya alba, 67
 cordiformis, 67
 glabra, 65
 laciniosa, 68
 microcarpa, 65
 ovata, 62
Castanea dentata, 81
 pumila, 81
 sativa, 82
Cat Spruce, 49
Catalpa, 12, 144
 bignonioides, 147

- Catalpa, Common, 147
 Hardy, 145
 speciosa, 145
 Western, 145
 Cedar, 5, 6
 Coast White, 6
 Red, 4, 5
 White, 5
 Celtis occidentalis, 16
 Cephalanthus occidentalis, 20
 Cercis canadensis, 14
 Chamaecyparis thyoides, 6
 Cherry, 31, 115
 Birch, 69
 Bird, 117
 Black, 116
 Choke, 116
 Fire, 117
 Pigeon, 117
 Pin, 117
 Rum, 116
 Sour, 120
 Sweet, 120
 Wild Black, 116
 Wild Red, 117
 Chestnut, 27, 81
 American, 81
 Dwarf, 81
 European, 82
 Japanese, 82
 Oak, 89, 92
 Chinese Magnolia, 102
 Sumach, 35, 37
 Chinquapin, 81
 Oak, 92
 Chionanthus virginica, 20
 Choke Cherry, 116
 Cigar Tree, 145, 147
 Cladrastis lutea, 38
 Clammy Locust, 120
 Coast White Cedar, 6
 Cock-spur Thorn, 111
 Coffee-tree, Kentucky, 35, 36
 Colorado Blue Spruce, 48
 Common Catalpa, 147
 Horse-chestnut, 133
 Juniper, 2, 6
 Locust, 120
 Papaw, 18
 Pear, 105
 Cordate-leaved Birch, 75
 Cork Elm, 97
 Cornel, 19, 138
 Alternate-leaved, 139
 Flowering, 139
 Cornus alternifolia, 139
 florida, 139
 Cotton-tree, 56
 Cottonwood, 56
 River, 58
 Swamp, 58
 Cow Oak, 89
 Crab, American, 105
 Narrowleaf, 106
 Siberian, 105
 Sweet, 105
 Crab Apple, Southern, 106
 Crack Willow, 52
 Crataegus anomala, 113
 Arnoldiana, 114
 Champlainensis, 114
 coccinea, 110

- Crataegus coccinioides var. di-
latata, 112
- Crus-galli, 111
 - Holmesiana, 114
 - Jonesae, 113
 - macracantha, 110
 - macrocarpa, 112
 - monogyna, 109
 - Oakesiana, 111
 - pedicillata, 112
 - Pringlei, 113
 - pruinosa, 112
 - rotundifolia, 112
 - submollis, 114
- Cucumber Tree, 103
- Custard Apple, 18
- Cut-leaved Birch, 32, 73
- Cypress, Bald, 9

- Date Plum, 21
- Diospyros virginiana, 21
- Dogwood, 123, 138, 139
 - Blue, 139
 - Flowering, 139
 - Poison, 122, 138
 - Striped, 127
- Douglas Fir, 10
 - Spruce, 10
- Downy Green Alder, 76
 - Poplar, 58
- Dwarf Chestnut, 81
 - Juneberry, 109
 - Juniper, 2, 6
 - Sumach, 122

- Elder, 140
 - Box, 37, 126
 - Poison, 122
 - Elder-leaved Mountain Ash, 108
 - Elm, 27, 30, 94, 96
 - American, 96
 - Cork, 97
 - English, 99
 - Northern Cork, 97
 - Red, 97
 - Rock, 97
 - Scotch, 99
 - Slippery, 97
 - White, 96
 - Wych, 99
 - English Elm, 99
 - Hawthorn, 32, 109
 - Oak, 89, 90
 - European Ash, 140
 - Beech, 80
 - Black Alder, 78
 - Chestnut, 82
 - Larch, 46
 - Linden, 135
 - Mountain Ash, 108
 - Paper Birch, 75
 - Sycamore, 127
 - Fagus grandifolia, 80
 - grandifolia var. caroliniana, 80
 - sylvatica, 80
 - sylvatica var. heterophylla, 79
 - sylvatica var. purpurea, 79
 - Fern-leaved Beech, 32, 79

- Fetid Buckeye, 133
 Fir, Balm of Gilead, 9
 Balsam, 9
 Douglas, 10
 Red, 10
 Scotch, 44
 Fire Cherry, 117
 Firtree, 9
 Flowering Cornel, 139
 Dogwood, 139
 Fraxinus americana, 144
 Biltmoreana, 141
 excelsior, 140
 nigra, 140
 pennsylvanica, 141
 pennsylvanica var. lanceo-
 lata, 144
 profunda, 142
 quadrangulata, 144
 Fringe, White, 20
 Fringe-tree, 20

 Ginkgo, 11
 biloba, 11
 Glaucous Willow, 49
 Gleditsia triacanthos, 35
 Glyptostrobos pendulus, 8
 Gray Birch, 73
 Oak, 25, 86
 Pine, 43
 Great Laurel, 19
 Great-leaved Magnolia, 103
 Umbrella Tree, 103
 Green Ash, 144
 Osier, 139
 Gum, 22
 Black, 22
 Red, 13
 Sour, 22
 Sweet, 13
 Gymnocladus dioica, 35, 36

 Hackberry, 16
 Hackmatack, 45
 Hamamelis, 24
 virginiana, 24
 Hard Maple, 130
 Pine, 41
 Hardhack, 28
 Hardy Catalpa, 145
 Haw, Black, 147
 Red, 110, 111
 Scarlet, 110
 Hawthorn, English, 32, 109
 Hazel, Witch, 24
 Hemlock, 7
 Spruce, 7
 Hickory, 39, 60
 Brown, 65
 Little Shag-bark, 65
 Shag-bark, 62
 Shell-bark, 62
 Small-fruited, 65
 Swamp, 67
 White-heart, 67
 Hoary Alder, 77
 Holly, 25
 American, 25
 White, 25
 Honey, 35
 Locust, 35
 Shucks, 35

- Hoop Ash, 140
- Hop Hornbeam, 28, 31
- Hornbeam, 28, 29
 - American, 29
 - Hop, 28, 31
- Horse Plum, 118
- Horse-chestnut, 132, 133
 - Common, 133
- Ilex opaca*, 25
- Indian Bean, 145, 147
- Ironwood, 28, 29
- Ivy, Poison, 123
- Jack Oak, 88, 93
- Japanese Chestnut, 82
 - Magnolia, 102
- Jersey Pine, 43
- Judas-tree, 14
- Juglans cinerea*, 60
 - nigra*, 60
- Juneberry, 31, 108
 - Dwarf, 109
- Juniper, 45
 - Common, 2, 6
 - Dwarf, 2, 7
- Juniperus communis*, 2, 6
 - communis* var. *depressa*, 2, 7
 - virginiana*, 4, 5
- Kalmia latifolia*, 19
- Kentucky Coffee-tree, 35, 36
- King Nut, 68
- Larch, 4, 45
 - American, 45
- Larch, European, 46
- Large-toothed Aspen, 54
 - Poplar, 54
- Larix decidua*, 46
 - laricina*, 45
- Laurel, Great, 19
 - Mountain, 19
 - Oak, 83
- Leverwood, 28
- Lilac, 20
- Lime-tree, 135
- Linden, 14, 30, 134
 - American, 136
 - European, 135
 - Silver, 135
- Linn, 136
- Liquidambar, 13
 - Styraciflua*, 13
- Liriodendron Tulipifera*, 24, 32
- Little Shag-bark Hickory, 65
- Loblolly Pine, 41, 42
- Locust, 38, 120
 - Black, 120
 - Clammy, 120
 - Common, 120
 - Honey, 35
 - White, 120
 - Yellow, 120
- Lombardy Poplar, 56
- Maclura pomifera*, 19
- Magnolia, 20, 21
 - acuminata*, 103
 - Chinese, 102
 - Great-leaved, 103
 - Japanese, 102

- Magnolia, *macrophylla*, 103
 Sweet, 102
 tripetala, 102
 virginiana, 102
 Maiden-hair Tree, 11
 Maple, 12, 125
 Ash-leaved, 37, 126
 Black Rock, 132
 Hard, 130
 Mountain, 126
 Norway, 126
 Red, 129
 Rock, 130
 Silver, 128
 Soft, 128, 129
 Striped, 127
 Sugar, 130
 Swamp, 129
 Sycamore, 127
 Three-toothed Red, 130
 White, 128
 Mockernut, 67
 Moosewood, 127
 Morus alba, 100
 rubra, 100
 Mossy-cup Oak, 94
 Mountain Ash, 38
 American, 107
 Elder-leaved, 108
 European, 108
 Western, 108
 Mountain Laurel, 19
 Maple, 120
 Mulberry, 16, 99
 Black, 100
 Paper, 16
 Mulberry, Red, 100
 White, 100
 Nanny Plum, 147
 Nannyberry, 147
 Napoleon's Willow, 52
 Narrowleaf Crab, 106
 Necklace Poplar, 56
 Nettle-tree, 16
 Newcastle Thorn, 111
 Northern Cork Elm, 97
 Scrub Pine, 43
 Norway Maple, 126
 Pine, 44
 Spruce, 46, 48
 Nut, King, 68
 Nyssa *sylvatica*, 22
 Oak, 23, 25, 27, 32, 82
 Barren, 87
 Basket, 89
 Bear, 87
 Black, 85
 Black Jack, 88, 93
 Box White, 94
 Bur, 94
 Chestnut, 89, 92
 Chinquapin, 92
 Cow, 89
 English, 89, 90
 Gray, 25, 86
 Jack, 88, 93
 Laurel, 83
 Mossy-cup, 94
 Over-cup, 90, 94
 Peach, 83

- Oak, Pin, 86
 Poison, 123
 Post, 94
 Red, 86
 Rock, 89, 92
 Rock Chestnut, 89, 92
 Scarlet, 85
 Scrub, 87
 Shingle, 83
 Spanish, 87
 Swamp, 91
 Swamp Post, 90
 Swamp White, 91
 Water, 83
 Water White, 90
 White, 90, 91
 Willow, 83
 Yellow, 85, 92
 Yellow-bark, 85
Ohio Buckeye, 133
Oilnut, 60
Old-field Birch, 73
 Pine, 41, 42
Oneberry, 16
Orange, Osage, 19
Oriental Spruce, 48
Osage Orange, 19
Osier, Green, 139
Ostrya virginiana, 28
Over-cup Oak, 90, 94
Oxydendrum arboreum, 31

Papaw, 18
 Common, 18
Paper Birch, 76
 Mulberry, 16

Paulownia, 13
 tomentosa, 13
Peach, 31, 115, 117
 Oak, 83
Peach-leaved Willow, 50
Pear, 26, 31, 104, 105
 Common, 105
Persimmon, 21
Picea Abies, 46, 48
 canadensis, 49
 mariana, 47
 Menziesii, 48
 orientalis, 48
 rubra, 47
Pigeon Cherry, 117
Pignut, 65
 Small, 65
Pin Cherry, 117
 Oak, 96
Pine, 4, 39
 Austrian, 45
 Gray, 43
 Hard, 41
 Jersey, 43
 Loblolly, 41, 42
 Northern Scrub, 43
 Norway, 44
 Old-field, 41, 42
 Pitch, 41
 Red, 44
 Scotch, 44
 Scrub, 43
 Shortleaf, 40, 42
 Soft, 40
 Table Mountain, 43
 White, 40

- Pine, Yellow, 40, 42
Pinus Banksiana, 43
 echinata, 40, 42
 Laricio var. *austriaca*, 43
 pungens, 43
 resinosa, 44
 rigida, 41
 Strobilus, 40
 sylvestris, 44
 Taeda, 41, 42
 virginiana, 43
 Pitch Pine, 41
 Plane-tree, 14
Platanus occidentalis, 14
 Plum, 26, 31, 115
 Canada, 118
 Date, 31
 Horse, 118
 Nanny, 147
 Red, 118
 Thorn, 111
 Wild, 118
 Yellow, 118
 Poison Ash, 123
 Dogwood, 122, 138
 Elder, 122
 Ivy, 123
 Oak, 123
 Sumach, 122
 Poplar, 31, 53, 54
 Balsam, 31, 57
 Black, 57
 Carolina, 56
 Downy, 58
 Large-toothed, 54
 Lombardy, 56
 Poplar, Necklace, 56
 Rough-barked, 57
 Silver, 53
 Trembling, 55
 White, 53
 Yellow, 24, 32
 Popples, 54
 Populus alba, 53
 balsamifera, 57
 candicans, 58
 deltoides, 56
 grandidentata, 54
 heterophylla, 58
 nigra, 57
 nigra var. *italica*, 56
 tremuloides, 55
 Post Oak, 94
 Poverty Birch, 73
 Prunus americana, 118
 Avium, 120
 Cerasus, 120
 nigra, 118
 pennsylvanica, 117
 Persica, 117
 serotina, 116
 virginiana, 116
 Pseudotsuga taxifolia, 10
 Pumpkin Ash, 142
 Purple Buckeye, 134
 Purple-leaved Beech, 79
 Pyrus americana, 107
 angustifolia, 106
 Aucuparia, 108
 baccata, 105
 communis, 105
 coronaria, 105

- Pyrus Cydonia*, 104
 hybrida, 107
 Malus, 104
 sitchensis, 108
Quaking Asp, 55
Quercus alba, 91
 bicolor, 91
 coccinea, 85
 falcata, 87
 ilicifolia, 87
 imbricaria, 83
 lyrata, 90
 macrocarpa, 94
 marilandica, 88
 Michauxii, 89
 Muhlenbergii, 92
 nigra, 83
 palustris, 86
 phellos, 83
 Prinus, 89, 92
 Robur, 89
 Robur var. sessiliflora, 90
 rubra, 86
 rubra var. ambigua, 86
 stellata, 94
 velutina, 85
Quince, 21, 104
- Raisin*, Wild, 147
Red Ash, 141
 Beech, 80
 Birch, 73
 Buckeye, 134
 Cedar, 4, 5
 Elm, 97
 Fir, 10
- Red Gum*, 13
 Haw, 110, 111
 Maple, 129
 Mulberry, 100
 Oak, 86
 Pine, 44
 Plum, 118
 Spruce, 47
Redbud, 14
Rhamnus cathartica, 26
Rhododendron, 19
 maximum, 19
Rhus copallina, 122
 Cotinus, 121
 glabra, 122
 Toxicodendron, 123
 typhina, 122
 Vernix, 123
River Ash, 141
 Birch, 73
 Cottonwood, 58
Robinia Pseudo-Acacia, 120
 viscosa, 120
Rock Chestnut Oak, 89, 92
 Elm, 97
 Maple, 130
 Oak, 89, 92
Rose Acacia, 120
 Bay, 19
Rough-barked Poplar, 57
Round-wood, 107
Rowan Tree, 108
Rum Cherry, 116
- Salix alba*, 53
 alba var. caerulea, 53

- Salix alba* var. *vitellina*, 53
 amygdaloides, 50
 babylonica, 52
 balsamifera, 49
 discolor, 49
 fragilis, 52
 lucida, 49
 nigra, 51
 pentandra, 50
 Wardi, 51
Sassafras, 17, 32
 variifolium, 17, 32
Savin, 4, 5
Scarlet Haw, 110
 Oak, 85
 Thorn, 110
Scotch Elm, 99
 Fir, 44
 Pine, 44
Scrub Oak, 87
 Pine, 43
Seaside Alder, 77
Service Berry, 109
Shad Bush, 108, 109
Shag-bark Hickory, 62
Sheepberry, 147
Shell-bark, Big, 68
 Hickory, 62
Shingle Oak, 83
Shining Willow, 49
Shortleaf Pine, 40, 42
Shucks, Honey, 35
Siberian Crab, 105
Silver Birch, 71
 Linden, 135
 Maple, 128
Silver Poplar, 53
 Spruce, 48
Single Spruce, 49
Skunk Spruce, 49
Slippery Elm, 97
Small-fruited Hickory, 65
Small Pignut, 65
Smoke Tree, 121
Smoking Bean, 147
Smooth Alder, 78
 Sumach, 122
Soft Maple, 128, 129
 Pine, 40
Sorrel-tree, 31
Sour Cherry, 120
 Gum, 22
Sourwood, 31
Southern Basswood, 136
 Crab Apple, 106
Spanish Oak, 87
Speckled Alder, 77
Spoonwood, 19
Spruce, 4, 46
 Black, 47
 Bog, 47
 Cat, 49
 Colorado Blue, 48
 Douglas, 10
 Hemlock, 7
 Norway, 46, 48
 Oriental, 48
 Red, 47
 Silver, 48
 Single, 49
 Skunk, 49
 Swamp, 47

- Spruce, White, 49
 Yellow, 47
 Staghorn Sumach, 122
 Striped Dogwood, 217
 Maple, 127
 Sugar Maple, 130
 Sugarberry, 16
 Sugar-tree, 130
 Sumach, 21, 38, 121, 138
 Chinese, 35, 37
 Dwarf, 122
 Poison, 122
 Smooth, 122
 Staghorn, 122
 Swamp, 123
 Venetian, 121
 Swamp Ash, 140
 Cottonwood, 58
 Hickory, 67
 Maple, 129
 Oak, 91
 Post Oak, 90
 Spruce, 47
 Sumach, 123
 White Oak, 91
 Sweet Bay, 102
 Birch, 69
 Buckeye, 134
 Cherry, 120
 Crab, 105
 Gum, 13
 Magnolia, 102
 Viburnum, 147
 Sycamore, 14
 American, 14
 European, 127
 Sycamore, Maple, 127
 Syringa vulgaris, 20
 Table Mountain Pine, 43
 Tacamahac, 57
 Tamarack, 45
 Taxodium distichum, 9
 Thorn, 26, 109
 Cock-spur, 111
 Newcastle, 111
 Plum, 111
 Scarlet, 110
 White, 110
 Three-thorned Acacia, 35
 Three-toothed Red Maple, 130
 Thuja occidentalis, 5
 Tilia americana, 136
 heterophylla, 136
 Michauxii, 136
 tomentosa, 135
 vulgaris, 135
 Tree of Heaven, 35, 37
 Tremble, 55
 Trembling Poplar, 55
 Tsuga canadensis, 7
 Tulip Tree, 23, 32
 Tupelo, 22
 Ulmus americana, 96
 campestris, 99
 fulva, 97
 montana, 99
 racemosa, 97
 Umbrella Tree, 102
 Great-leaved, 103

- Venetian Sumach, 121
 Viburnum Lentago, 147
 prunifolium, 147
 Sweet, 147

 Walnut, 39, 58, 60
 Black, 60
 White, 60
 Ward's Willow, 51
 Water Beech, 29
 Oak, 83
 White Oak, 90
 Weeping Beech, 80
 Birch, 74
 Willow, 52
 Western Catalpa, 145
 Mountain Ash, 108
 White Ash, 90, 144
 Basswood, 136
 Beech, 80
 Birch, 73, 74, 76
 Cedar, 5
 Elm, 96
 Fringe, 20
 Holly, 25
 Locust, 120
 Maple, 128
 Mulberry, 100
 Oak, 91
 Pine, 40
 Poplar, 53
 Spruce, 49
 Thorn, 100
 Walnut, 60
 Willow, 53
 Wood, 24, 32

 White-heart Hickory, 67
 Wickup, 136
 Wild Black Cherry, 116
 Plum, 118
 Raisin, 147
 Red Cherry, 117
 Willow, 31, 49
 Almondleaf, 50
 Balsam, 49
 Bay-leaved, 50
 Black, 51
 Blue, 53
 Crack, 52
 Glaucous, 49
 Napoleon's, 52
 Oak, 83
 Peach-leaved, 50
 Shining, 49
 Ward's, 51
 Weeping, 52
 White, 53
 Yellow, 53
 Witch Hazel, 24
 Wych Elm, 99

 Yellow Birch, 71
 Buckeye, 134
 Locust, 120
 Oak, 85, 92
 Pine, 40, 42
 Plum, 118
 Poplar, 24, 32
 Spruce, 47
 Willow, 53
 Wood, 38
 Yellowbark Oak, 85



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